SHIPS AND SEA-POWER BEFORE THE GREAT PERSIAN WAR

MNEMOSYNE

BIBLIOTHECA CLASSICA BATAVA

COLLEGERUNT

A.D. LEEMAN · H.W. PLEKET · C.J. RUIJGH

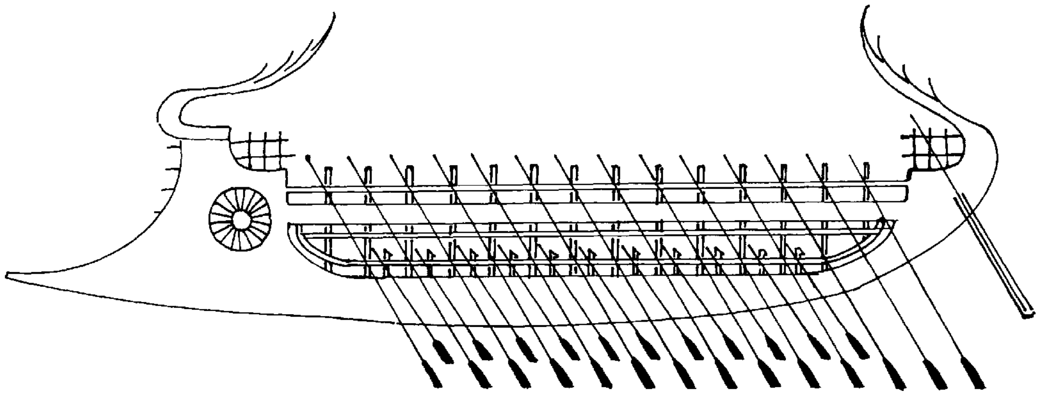
BIBLIOTHECAE FASCICULOS EDENDOS CURAVIT

C. J. RUIJGH, KLASSIEK SEMINARIUM, OUDE TURFMARKT 129, AMSTERDAM

SUPPLEMENTUM CENTESIMUM VICESIMUM PRIMUM

H.T. WALLINGA

SHIPS AND SEA-POWER
BEFORE THE GREAT PERSIAN WAR



SHIPS AND SEA-POWER BEFORE THE GREAT PERSIAN WAR

THE ANCESTRY OF THE ANCIENT TRIREME

BY

H.T. WALLINGA

E.J. BRILL
LEIDEN • NEW YORK • KÖLN
1993

The paper in this book meets the guidelines for permanence and durability of the Committee on Production Guidelines for Book Longevity of the Council on Library Resources.

Library of Congress Cataloging-in-Publication Data

Wallinga, H. T.
Ships and sea-power before the great Persian War: the ancestry of the ancient trireme / by H.T. Wallinga.
p. cm.—(Mnemosyne, bibliotheca classica Batava. Supplementum, ISSN 0169-8958; 121)
Includes bibliographical references and indexes.
ISBN 9004096507 (alk. paper)
ISBN 9004097090 (pbk.: alk. paper)
1. Sea-power—Greece—History. 2. Sea-power—Iran—History. 3. Triremes—History. 4. Greece—History, Naval. 5. Iran—History, Naval. I. Title. II. Series.
VA523.W36 1992
359'.03'0938—dc20 92-16496
CIP

ISSN 0169-8958
ISBN 90 04 09650 7

© Copyright 1993 by E.J. Brill, Leiden, The Netherlands

All rights reserved. No part of this publication may be reproduced, translated, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without prior written permission of the publisher.

Authorization to photocopy items for internal or personal use is granted by E.J. Brill provided that the appropriate fees are paid directly to Copyright Clearance Center, 27 Congress Street, SALEM MA 01970, USA. Fees are subject to change.

PRINTED IN THE NETHERLANDS

To my sons T., G.J. and M.W.
and their mother

TABLE OF CONTENTS

Preface ix
List of illustrations xiii

I. Introduction 1

II. Thukydides and early naval developments 13

III. Shipping in the eighth century B.C. 33

IV. The new Greek sea-powers of the sixth century B.C. 66

V. The invention of the trireme and the creation of the Persian navy 103

VI. The trireme in Hellas: Themistokles' navy bill and the Persians 130

VII. Epilogue 165

Appendix: the crews of Greek and Persian triremes 169

Bibliography 187

Index of ancient authors cited 195
General index 202

Illustrations

PREFACE

These studies of East-Mediterranean shipping in the archaic period (*c.*735-481 BC) had their origin in a seminar on the great Persian War of 480 which I gave in the academic year 1962-63 at the University of Amsterdam. I was struck then (as I still am) by the easiness with which very many scholars assume that the naval potential of the Greeks, once they decided to co-operate, would be a match for that of the Persian empire; and indeed concluded that awareness of this enabled statesmen like Themistokles to frame and pursue a coherent anti-Persian policy, chiefly based on naval capabilities, which in the end resulted in the elimination of the Persian danger.

My own impression was that this view, expressed most strongly by Eduard Meyer and repeated by many others with more or less nuance, fatally neglected contrary indications in the historical tradition and in the iconographical evidence concerning the archaic sea-powers. To judge by these indications naval armaments were by no means ubiquitous in the late archaic period and in as far as they existed were not at all as large-scale as they ought to have been to warrant the modern assessment of their political effects. The few students who attempted to find alternatives for Meyer's view and for the concomitant estimate of the countervailing policies of the Persians steered clear of the naval problems and for this reason found no effective arguments. Hence the *dialogue des sourds* that recently culminated in *CAH* IV[2].

This situation has been my chief motive to tackle the neglected problem of the development of the archaic sea-powers. It is in this context that the chief crux of the debate is to be found, but also footholds for new efforts to understand. The fact is that research in the maritime field has been extremely one-sided in the past and has concentrated on the ships as material objects and on sea-power as an abstraction, while the context—economic, political and military—where those ships and powers functioned was taken for granted. The invention of the trireme in particular was studied as no more than a matter of technical improvement: the question whether there existed naval establishments needing, and capable of exploiting the qualities of, this mighty ship was scarcely touched. Vital evidence was disregarded and analysis of Thukydides' crucial testimony regarding the growth of Greek *nautika* as a statement on organization and strategical scope left undone.

I have tried to remedy these omissions by presenting a coherent hypothesis concerning all the developments involved and working up

all the data that could possibly have relevance. My message is simple: the capabilities of the Greek (and also the Phoenician) states have been grossly exaggerated and radical naval developments ascribed to them, which we must indeed assume but belong in the very different context of the near-eastern kingdoms, incidental first steps excepted. Conversely, the contribution of these kingdoms to the technical and especially the infrastructural innovations in the naval sphere has been as grossly underrated. The immense scaling up of the Greek naval establishments that was provoked by Xerxes' mobilization, and the crucial share therein of the Athenian building programme (and its unforeseeable financial basis), has in consequence not been recognized for what it was.

As will be clear, this book has been very long in the making. Adverse personal circumstances have caused very long delays in research and writing and this may have resulted in some unevenness of composition and style, for which I offer my apologies. Because of its controversial thesis it is not deficient in polemic: I hope that those coming under fire will join in the fight. Like the hypotheses I attack, mine needs contradiction where it is weak, and in any case refinement even where it may be right in principle. It can only benefit by the choc des opinions: there has been far too little of it.

Friends and colleagues have supported my work in many ways, in the first place the happy band collaborating in the Achaemenid Workshops organized by Heleen Sancisi-Weerdenburg and Amélie Kuhrt: it has been the sympathetic auditorium of my first attempts at organizing my argument, especially the near-eastern side of it. I owe much to discussions, written or oral, with professors Lionel Casson, J.K. Davies, S.L. Radt, W.J. Verdenius and M.A. Wes. Chapters of this book were read and commented upon by Dr. H.W. Singor and by professors Frederick Van Doorninck Jr. and Pierre Briant; the whole by professor A.M. Snodgrass, whose encouraging comments were very precious to me; and by professor W.M. Murray, whose very valuable comments I received when the manuscript had already been given to the printers, and so could not exploit to the full. To all of them I express my warmest thanks.

I am particularly obliged to Dr. Hermann Kienast of the German Archaeological Institute in Athens for most generous permission to write about the unpublished *Schiffsbasis* in the Samian Heraion, and for ample information concerning this most valuable piece of evidence. I

am further grateful to Professor J.S. Morrison and the Syndics of the Cambridge University Press for allowing me to use a drawing from *GOS*, and to musea and institutes for permission to use their photographs to illustrate my argument, and in particular to the staff of the Musée du Louvre for permission to examine their matchless collection of geometric and archaic ship pictures. Finally I owe a great debt of gratitude to Mr. Frans Erens for some superb drawings; to mr. J. van Leersum for putting my cross-sections into shape; and to mr. G.J. Wallinga for correcting my foreigner's English.

Utrecht
March 1992 H.T. Wallinga

LIST OF ILLUSTRATIONS

FRONTISPIECE: This drawing of a hypothetical pentekontor combines features of the oarage of three contemporaneous geometric ship representations (Ills. 12, 14, 9 = *GOS* Geom. 2, 9 and 10; *c*.760-*c*.735 BC). It illustrates the technical potential of the period and confirms Thukydides' dating of the naval organization that was based on this potential to the last quarter of the eighth century.

1. Sailing ship *c*.515 BC (= *GOS* Arch.85). Photo The British Museum (B 4159).
2. Merchant galley/*eikosoros* *c*.700-650 BC (= *GOS* Arch.5). Drawing from A.Köster 1923: Tafel 35.
3a. Hypothetical cross-section[1] of Homeric *monokrotos* galley.
3b. Id. of *eikosoros* with hatches, raised gunwale and rowing-benches.
4. Plan of ship dedication stereobate in the Heraion of Samos (Courtesy Deutsches Archäologisches Institut Athen).
5. Hypothetical cross-section of trireme (= *GOS* Pl.25).
6. Hypothetical cross-section of *monokrotos* galley with fighting deck.
7a. Hypothetical cross-section of *dikrotos* galley with *parexeiresia* (size of ledger exaggerated).
7b. Isometric projection of pentekontor based on the contours of the stereobate of Ill.4.
8. Hypothetical cross-section of merchant galley (*eikosoros*) with deck, hatches and *parexeiresia*.
9. *Dikrotos* galley without visible tholes; both thranite and zugian oarsmen shown; *c*.760-735 BC (= *GOS* Geom.10). Photo Musée du Louvre (AGR A 530/S450).
10. Midships segment of *dikrotos* galley; wicker (?)

[1] In this and the following cross-sections I am primarily concerned with the oarage of the galleys in question and so with the situation on deck. My drawings are intended as simplified variants of *GOS* Pl.25 (cf. my Fig.5), but in no way as representations of the underwater part of the ship.

screens protecting zugian oarsmen; *c*.735-710 BC (= *GOS* Geom.44). Photo National Archaeological Museum Athens (277).

11. Id.; screens in other material? of same date as Ill. 10 (= *GOS* Geom.43). Photo National Archaeological Museum Athens (276).

12. *Dikrotos* galley, similar to that of Ill.9, with *parexeiresia*, thranite and zugian tholes shown, but no oars; figures standing on level of *zuga* and of thranite rowing-benches; of same date as Ill.9 (= *GOS* Geom.2; cf. *GOS* Geom.4). Photo Musée du Louvre (AGR A 527).

13. Id.: similar to the galley of Ill.9, but without the zugian tholes; a rectangular sail; of same date as Ill.9 (= *GOS* Geom. 8). Photo Deutsches Archäologisches Institut Athen (NM 4300).

14. Id.: similar to the galley of Ill.9; 14 thranite tholes, 4 oversize (heroic?) oarsmen, no zugian tholes; of same date as Ill.9 (= *GOS* Geom. 9). Photo Musée du Louvre (AGR A 517).

15. Id.: similar to the galley of Ill.9, without visible tholes; zugian oarsmen shown only; of same date as Ill.9 (= *GOS* Geom. 11). Photo Deutsches Archäologisches Institut Athen (NM 3470).

16. Galley with *parexeiresia*; 19 thranite oarsmen shown and 21 zugian tholes; of same date as Ill.10 (= *GOS* Geom. 42). Photo Royal Ontario Museum (66GR.-265).

17. Id.: no zugian tholes shown; the thranite tholes (?) set between the shores of the *parexeiresia*, not identical with their upper ends; what has been drawn looks more like the oar-strap (τροπωτήρ) than the thole itself; of same date as Ill.2 (= *GOS* Arch.2). Photo Deutsches Archäologisches Institut Athen (NM 3588).

18. Id.: 10 thranite tholes, oars nor oarsmen shown; lower part of *parexeiresia* construction covered by screen; *c*.550-530 BC (= *GOS* Arch.52). Photo Staatliche Antikensammlungen München (KM 3179).

19. Phoenician *dikrotos* galley of the time of Sennacherib; 704-681 BC (British Museum 124772 = *GOS* Pl. 22a). Photo The British Museum (E 2015).

20. Drawing of a wall-relief in gypsum from the palace of Sennacherib (= A.H.Layard, *Monuments of Nineveh* I, Pl.71). The ships are Phoenician galleys engaged in evacuating Luli, king of Tyre and Sidon, from Tyre.

21a. Cross-section of galley of Ill.19 after Salonen (1939: 40).

21b. Alternative cross-section of the same galley; the dotted lines below the *parexeiresia* represent the screens.

22. *Monokrotos* galley: 10 (or up to 12) thranite tholes without oars; in ledger of *parexeiresia* circular openings corresponding with thranite tholes; underneath lighter coloured screen; middle to late sixth century BC (= Hesperia XLII (1973), fig.14). Photo American School of Classical Studies Athens (72-62-23).

23. *Dikrotos* galley: 7 or 8 thranite tholes; screen with semi-circular cut-outs near the invisible zugian tholes; *c.*530-480 BC (= *GOS* Arch.57). Photo Musée du Louvre (AGR F 123).

24. Galley with 39, perhaps meant as 40, oars; of same date as Ill.10 (= *GOS* Geom.19). Photo The British Museum (C 1097).

25. Hypothetical cross-section of Polykrates' *samaina*, combining deck and hatches of the *eikosoros* with the oarage of the pentekontor (*c.*535-525 BC).

CHAPTER ONE

INTRODUCTION

What we know of East-Mediterranean shipping in the eighth to sixth centuries B.C. is based on a fairly large number of ship-representations, a few from the Near-East, but most from Greece, and on Greek literary sources. It is only in recent years that both categories of data have been made adequately accessible: the relevant Greek ship-representations very fully and exemplarily by R.T. Williams in his and J.S. Morrison's *Greek Oared Ships* (1968); less fully in Lionel Casson's *Ships and Seamanship in the Ancient World* (1971) and in D. Gray's *Seewesen* (1974). Those of the Near East have been collected in M.-Chr. de Graeve's *The Ships of the Ancient Near East* (1981) and both categories now together in L. Basch's sumptuous *Musée imaginaire* (1987). The literary material has been made accessible above all through the excellent Index of Citations in *SSAW.*

Studies of the development of the ship during the period in question have been chiefly based on the pictorial data; those of the development of sea-power on the testimonies of the great fifth-century historians. I shall not here try to characterize the results and the differences between them. What interests me now is what they have in common. For there are some basic assumptions that are generally adhered to and determine the discussion. There seems to be agreement (1) that the sailing ship as an independent type is coeval with the galley and had developed entirely on its own (if this important category is seriously discussed at all). Further it is thought (2) that the ship which developed in the period our sources cover was solely the galley, more particularly the war galley, and that successive innovations were introduced in answer to the requirements of naval warfare and tactics, in particular ramming tactics. Finally it is firmly believed (3) that the ultimate stage of this development, the emergence of the war galley known as trireme (Greek τριήρης, Latin *triremis*), took place well before the end of the sixth century and in the world of the Greek *poleis* (or alternatively in that of the Phoenician city-states). This would imply that these small polities had need of and were able to finance the building and the use of a specialized warship that was much bigger and needed far more personnel than any vessel securely attested for the archaic period in our iconographical and literary documentation.

However, these basic tenets of virtually all modern students of early Greek and Phoenician shipping are open to serious doubt:

(1) The idea seems to be widely held that sailing ships existed and were used from the beginning of post-Mycenean Greek history, not to say that in this respect the Mycenean situation simply continued (on a reduced scale) after the collapse of *c.*1200. Casson for instance introduces the sailing ship of the period 1000-500 BC with the words 'The round hull, favored earlier by Crete and the Levant ..., is now attested from Phoenicia to Italy' (*SSAW* 66). Gray has based the taxonomy of the archaeological evidence for Homeric shipping on the distinction of 'Galeerentyp' and 'Kaïkityp' (1974: passim) and Basch also takes one of the earliest geometric ship representations, the Fortetsa model (1987: fig.321, p.159.2, cf. *GOS* Pl.1*f*), as 'un navire de commerce, un très petit caboteur sans doute' and by implication as a sailing ship. Casson has even stated that, though 'many more types of merchant galleys are known than sailing ships, ... there must have been more of the latter in service *at any given time* <my italics>' (*SSAW* 158). However, both the assumption of technological continuity and the interpretation of ship representations in this sense are not well-founded: the geometric and archaic data in aggregate plead against them, as I shall show in my third chapter, in particular the absence of unmistakable instances of sailing ships until the end of the sixth century in both the iconographic and the literary evidence. It seems to be forgotten that a number of conditions must be fulfilled before ships that exclusively depend on the sail can become a viable proposition. Not only have 'the pace and volume of overseas commerce' (*SSAW* 65) to grow to a certain level and above all become regular at that level; sailing routes, i.e. routes where the winds favour sailing in both directions either by regular alternation or by being usable both ways with the wind abeam, must become known through scouting. In our period the first of these conditions is taken to have been satisfied not before the end of the seventh century (see e.g. Austin, Vidal-Naquet 1977: 69); the second in the same epoch on the routes to and from the western Mediterranean and perhaps even later on the routes to Egypt (see p.34 and p.92 respectively; for the routes to the Black Sea no direct evidence is available[1]). Wind conditions of course become less constraining once sailors master the art of working to windward, but direct evidence of this technique is non-existent for the older period. Still, I presume that the existence of pure sailing ships

---

[1] A route where round voyages were possible with the same (summery) north-west wind abeam is the stretch between Phoenicia and Egypt. I have no doubt that its use led to (if it does not presuppose) the navigation by the stars for the pioneering of which the Phoenicians were famous (Str.XVI 2.24 C757). Perhaps there were more stretches where this was possible.

presupposes this skill and that it can therefore be dated to the last quarter of the sixth century at the latest (see p.33).

This was also the time of another development. In the epic tradition ship-owners (the later *nauklêroi*) were landed proprietors who also must have been the central figures in the Athenian *naukrariai* and similar organizations (see Vélissaropoulos 1980: 14-21; below p.17). Now another type of *nauklêros* is documented for the first time in the person of Sostratos of Aigina (Hdt.IV 152.3). This kind of *nauklêros*, the professional master mariner, may already be adumbrated in Homer's description of the ἀρχὸς ναυτάων ('captain of sailors') by the Phaiakian Euryalos (*Od.*VIII 161-64), for Euryalos' assumption that such a man would not have time for the usual aristocratic pastimes suggests that something like full-time occupation is meant. Nevertheless I do not think that there is a compelling reason to make this hypothetical fellow a true merchant captain and there certainly is no reason whatever to associate him with the sailing ship: a many-tholed galley—νηῦς πολυκλῆις—is ascribed to him. In the case of Sostratos on the other hand it is reasonable to expect this association; but though in theory he may have had predecessors in this respect, I would hesitate to date them much further back[2].

Now it is conceivable, and it may even be probable, that all these conditions and institutional prerequisites had been fulfilled in the heyday of Minoan and Mycenean maritime activity. It is in any case suggested that sailing ships are to be seen in the pictures of that period (Casson 1969: 186; *SSAW* 32f., 66; Gray 1974: 38-40), though the perspective of such suggestions is almost always iconographic and rarely extends to the economic and organizational context. However, taken by itself a ship or boat with round/broad features and/or without oars must not be taken as a sailer as a matter of course. Such a ship still may be a galley, like the ship mentioned in the story of the blinding of the Cyclops (*Od.*IX 322-23, explicitly called oared; see p.41) and the massive galley pictured on the Aristonothos vase (Ill.2, see *GOS* Arch.5 and Williams' comment).

---

[2] Homer's captain may well have been meant as the counterpart of Odysseus' Cretan alias (*Od.*XIV 192ff., esp.245f.), for whose voyage to Egypt some form of πρῆις on the part of his companions may have been the motive, which need not have excluded other aspirations on their part; nor must it imply that the captain was a trader (see Humphreys 1978: 167f.). For Sostratos see now Johnston 1972: 416–423, where the documentary evidence for his existence is evaluated, and also Starr 1982: 428. I do not understand what Starr drives at in suggesting (*ib.*, p. 426) that Euryalos' description of the merchant captain already implies the conscious understanding of 'the <economic?> concept of making gains by seaborne exchange': is more meant by this vague phrase than the traditional Homeric exchanges and the gains they brought?

So the kind of differentiation generally ascribed to the shipping of the geometric and archaic periods is questionable and the resulting picture may well exaggerate its development on a number of scores. Such exaggeration, as I shall show, is paralleled when other aspects of shipping or its social context are concerned.

(2) The observation that virtually all ship pictures painted on Greek pots of the geometric and archaic periods represent galleys and that several pictures show armed men and also scenes and attributes of fighting has led scholars to think that the ships pictured must be warships: thus e.g. Casson in the captions of the figures in question in *SSAW* (70 to 74 being typical); Göttlicher 1985: *passim*; and Morrison in M., Coates 1986, the captions of figs.23-26 being most revealing; and even if this identification is avoided, or at any rate veiled in less outspoken phraseology, as e.g. by Williams in *GOS* and by Gray, the views on the point discussed are probably not very different in practice. That is not to say that they are well founded. It is obvious that in times of great insecurity—as in early Greek history (see Ormerod 1924: 94ff.)—merchantmen were exposed to attack by pirates and their likes and therefore could not do without arms and armed crew members. In early modern history merchantmen were armed as a rule and differentiation between these ships and the warships of the time slight or non-existent. The situation must have been the same in the pre-classical period. Failure to see that the warship was not (or only marginally) a separate category at that time really frustrates the understanding[3]. In fact the notion of 'warship' as applied to geometric and archaic representations is a projection of a later development onto the earlier periods. It is the consequence of the overwhelming emphasis on the trireme and later warships in the earlier stages of modern research. Because students concentrated on these types, it simply did not occur to them that the prior developments they assumed could have been caused by factors outside the sphere of naval warfare. The narrowness of their perspective does indeed make their work typical for antiquarian research as it has been defined by Momigliano (1966: 1-39). They mostly treated the problem of the development of early shipping in the margin of collecting and classifying the evidence for the warships they were dealing with. In this they continued (and still continue) the by now antiquated scholarly practice of *Antiquitates militares* and *privatae*. As Momigliano argues, the survival of the antiquarian method in this

---

[3] This is evident in Vélissaropoulos' discussion of the *naukraria* (1980: 14ff.), and especially in Bravo's remarks on the subject (1977: 27ff. and 1984: 127; cf. p.17 n.13). Cf. also Hainsworth's comment on *Od.*VIII 161.

branch of scholarship is explained by the nature of the institutions dealt with: 'it is easier to describe <them> than to explain them genetically' <it is not only a matter of description, but even more of 'explanation' at a low level of sophistication>; in the case of shipping in particular 'the nature of the evidence is such that one has to combine items belonging to different historical periods in order to obtain the picture of an institution' (*ib.*, p.24-25).

A striking example is the treatment of the reasons for innovations prior to the invention of the trireme. It is assumed as a rule that considerations of what is called 'ramming tactics'—a modern term for which there is no precise ancient equivalent—were behind the changes in construction and capacity inferred from the iconographical record and other data. Morrison for instance boldly asserts that 'the Aristonothos vase ships <Ill.2 = *GOS* Arch.5>, painted in the first half of the seventh century, show the direction which the development of the oared warship was taking ... The characteristics which come to be associated with triereis in battle—power, speed and agility—are those demanded by ramming tactics ... Ramming is therefore likely to have been a subsidiary <??> tactic in the age which produced the Aristonothos vase, and the vase may well represent an action in which a ship equipped for ramming ... as well as for fighting from the deck is shown in conflict with a ship equipped for the latter only' (1986: 28). This interpretation, however, has very little to recommend it and for more reasons than the elementary one that more than one or two ships with a ram are needed to make a picture illustrate ramming tactics[4].

The scene pictured by Aristonothos is that of a small (ten-oared) galley attacking a ship of roundish profile (probably oared, but no oars are shown; most probably a pirate and his prey: thus Casson, *SSAW* 68). In view of the objective of the attackers it is extremely improbable that they intended to ram: ancient pirates cannot have been in the habit of sinking their quarry. The picture in other words definitely is not a sample of naval 'warfare' at all, let alone of naval tactics. That it nevertheless is put forward in the discussion of ship development must be

---

[4] It is indeed remarkable that the ram is regularly taken by itself as signifying ramming tactics. This is an elementary mistake: strictly speaking the picture of one or two ships cannot illustrate ramming tactics. For individual ships the ram is to be considered primarily a *defensive* weapon, to be used in warding off attempts at boarding. Two conditions must be fulfilled for it to become an offensive one: first squadrons of several ships must be formed with a view to mutual protection in collective action, then these squadrons must be trained for co-ordinated offensive action. Only the second step can lead to ramming tactics. It is an illusion to think that the two things always went hand in hand: they did not in the navy of fifth-century Corinth (see p.24f.).

because it is one of the very few pictures dating to the first half of the seventh century that offers something not wholly analagous to the geometric iconography of ships. Whoever wants to date the invention of the trireme to the seventh century must be tempted to exploit such a datum, but in this case it can only be done by forcing it into that context. This argument is already fatal: there is also another reason why Morrison's interpretation must be rejected.

The first explicit and unmistakable reference to tactics in the naval sphere is much later than this picture; the reference suggests, moreover, that the matter was not common knowledge at the time. It is made by Herodotos in describing the preliminaries of the battle of Lade that ended the Ionian revolt in 494. The Ionian commanders had then been persuaded by their Phokaian colleague Dionysios to subject their crews to a training course that taught them to execute the manoeuvre of *diekplous*, an important element in ramming-tactics (Hdt.VI 11.2—12.4). Dionysios at that moment clearly was the only Ionian commander to have tactical expertise of any refinement and this is indeed explained by the fact that, as I shall demonstrate (ch.IV.1), Phokaia was the only Greek *polis* to have prior experience of the regular fighting at sea with fleets or squadrons that must be assumed as a background for the development of sophisticated tactical concepts. Herodotos' description of the battle of Alalia of *c.*540 (I 166.2-3) proves that the skill of the Phokaians was already highly developed at that time. There is on the other hand no evidence that it dated much further back, and no indication whatever, witness the Ionians at Lade, that all other *poleis* had progressed, or were to progress, in the same way, quite on the contrary. In the battle of Sybota in 433 Corinth, according to Thukydides the foremost naval power in Greece of the archaic period, still used a primitive, non-ramming, tactical concept (Th.I 13. 2-5 and 49.1-3; see p.24). Therefore the invocation of ramming-tactics to explain ship development of more than a century earlier simply is inadmissible. And there is another, hardly less fatal, objection to the notion of ramming-tactics in the context of the early *polis*. The world of these small states hardly is the setting where the concept could come into being: they simply were not capable of the heavy financial investments involved, as the Corinthian experience in 433 shows. This brings me to the third of my set of basic assumptions.

(3) The development of such tactical concepts means experience of *regular* fighting at sea with fleets of some size. This implies that use is made of such fleets by states sufficiently powerful to have a definite naval policy that necessitates the use of navies against equally powerful

rivals, and rich enough to finance the repeated mobilization and training of its units. Certainly it is often assumed that the Greek and Phoenician maritime states had these financial and political capabilities, most insistently in the case of Athens by the great Eduard Meyer and his followers. Meyer's interpretation of the supposed naval building programme, thought to have been proposed in 493 by Themistokles, and of the political and strategic thinking behind it does indeed make Athens already at that early moment a great power, able to challenge the Persian empire as the leader of a politically united Greece: 'ihrer (Athens'> Erhebung zur ersten Macht der Mittelmeerwelt galt all seine <Themistokles'> Tätigkeit' (1939: 293). With this view Meyer found a large following[5], which includes the author of the most recent large-scale publication on the subject in *CAH* IV², Hammond. Like Meyer, he pictures the Athens of the years before 483 as a power ready to confront the Persian empire: 'to proceed with hostilities against the island states which had helped the Persians <in the campaign of Marathon>' and thus to follow Miltiades' personal policy 'of a naval offensive in the Aegean as a form of defence against the threat from Persia, more generally the policy of war *à l'outrance* with Persia' and 'the decision not to seek any compromise with Persia' (1988: 519, 521, 522). Accordingly the power of Athens and its potential allies in 490 is estimated at over 200 triremes, to which Athens is taken to have been able to contribute 70 triremes, Aigina 50 to 60 and Eretria, Megara and Corinth presumably somewhat smaller fleets (1988: 504 and 518).

However, such an assessment of Greek naval power is already confuted, and unambiguously so, by Thukydides. Thukydides specifically affirms (I 14) that up to the time of Darius' death (in 486) triremes in great number (ἐς πλῆθος, i.e. 50 or 60) were not to be found in any of the *poleis* mentioned by Hammond: only the Sikeliot tyrants and Korkyra possessed them (Korkyra 60: Hdt.VII 168.4) and just before Xerxes' expedition only these navies could be considered of any importance (ἀξιόλογα: Th.I 14.2) in the Greek world. Thukydides stipulates that Aigina, Athens and possibly some others had insignificant (βραχέα) navies at that time, consisting for the most part of pentekontors. This precise statement cannot be ignored as it is by Hammond, who writes

---

5 Practically all later interpretations of the situation in Athens in 483, as well as of the conflict between Greeks and Persians, bear his stamp (most recently Weiler 1988: 232-233; Musti 1989:287-288). See for an evaluation of Meyer's influence in the same vein Wolski 1985: 113f. Wolski's claim (n.5) that Wilcken and Bengtson were the first 'à se distancer de ce propos' is due to crass misunderstanding: both authors followed Meyer's lead to the last (cf. Wilcken 1962: 134; Bengtson 1980: 161f.). The most important exception is Will (1964: 70ff.; 1972: 83-124).

as if it did not exist[6], for as I shall argue it is of a piece with the rest of our evidence for archaic shipping. Analysis of the whole of this evidence (see ch.II) leads to the conclusion that up to 483 the *polis* navies in Greece, Corinth's excepted, were very small, the Athenian one consisting of two ships; that naval operations of any scale involved the mobilization of merchant, or general purpose, galleys (summed up in Thukydides' πλοῖα μακρά: I 14.1); and that for this reason, and because of the financial implications, such operations took very long to prepare (a few cases are known, two of which took five years; the same may well have been true for a third: see Hdt.I 166.1; III 59.2-3 and 39.4). In the perspective of this conclusion such a view of Miltiades' Parian adventure as Hammond's: 'The Athenians now mustered their full fleet of 70 ships <read triremes> with a complement of crews or marines totalling some 14,000 men and provided the funds necessary for their maintenance' (1988: 518), becomes absolutely untenable.

Generally speaking such notions assume too large a scale and too great an economic development for the world of the *polis*, even for Athens. Not only that most navies in Greece proper were insignificant: also there is no trace of the specific infrastructure that navies of 50 and more triremes require, except again for Corinth (though no more than traces: Th.I 13.5; Str.VIII 6.20 C378). Fiscal institutions capable of generating the massive funds demanded by a standing navy of 70 triremes are not in evidence in Athens, as the believers in such navies practically concede by their silence on this point. Their misjudgement of the capabilities of the Greek *poleis*, so completely at variance with the results of recent research on the ancient economy, still seems to be under the spell of Meyer's modernizing interpretation of the economic development of the Greek world, which is now thoroughly discredited (see Finley 1980: 45-48[7]).

But where the development of Greek sea-power and especially the Athenian navy is concerned, another element in Meyer's work seems to be even more influential, viz. his interpretation of Themistokles' contribution to it (1939: 291ff.). According to Meyer, the Athenian involve-

---

[6] Meyer also ignores it, but he is prudent enough not to contradict Thukydides. In *CAH* IV^2 Thukydides' crucial testimony as far as I can see is mentioned only once and radically misinterpreted. Hammond wrongly quotes it together with Hdt.VII 144.1-2 as implying that 'before 483 ... the Aeginetan navy again proved itself superior to the Athenian navy' (p.453: the fact of an Aiginetan victory is stated in so many words by Herodotos VI 92.1, but in none of these passages is there a time reference or any reason for Hammond's 'again': there is no record whatever of previous large-scale naval confrontations).

[7] For recent discussion of this complex question, which is ignored in *CAH* IV^2, see Hopkins 1983 and Cartledge 1983.

ment in the Ionian revolt and the certainty 'daß nach dem Falle Milets der Großkönig einen Rachezug entsenden werde' led in Athens to a hot political debate between appeasers led by Hipparchos son of Charmos, 'wie schon der Name sagt <!>, ein eifriger Parteigänger des Peisistratidenhauses', and others who 'forderten ... die energische Vorbereitung für den Entscheidungskampf'. The latter had Themistokles as their leader and he had two aims: the salvation of Athens and 'ihre Erhebung zur ersten Macht der Mittelmeerwelt'. He saw only one means 'die Unabhängigkeit zu behaupten <!>', viz. 'die Schöpfung einer griechischen <!> Seemacht'. To attain this objective he struggled indefatigably for ten years until he 'die Massen dazu gebracht hatte, ans Werk zu gehen, daß er die ganze Bevölkerung mit Enthusiasmus für seine Idee erfüllte und im entscheidenden Moment mit sich fortriß, so daß sie es wagten alles aufzugeben um alles zu gewinnen: das ist Themistokles' welthistorische Größe'. What lured him and his adherents forth was a glorious 'Siegespreis wie ihn innerhalb der griechischen Welt wenige Jahre vorher auch die kühnste Phantasie nicht hätte erträumen können'[8].

If one thinks of the poverty of the tradition for Athens' history during the years between Kleisthenes' reforms and Xerxes' invasion and of the virtual silence about Themistokles' part in it before his proposing the navy bill in 483/2 in particular; and if one considers that Herodotos in his account of that occasion (VII 144) denies, practically in so many words, that the Persian threat had anything to do with it (a démenti that is strongly reinforced by Plutarch: *Them.* IV.2; see p.158), Meyer's interpretation is truly amazing. What one must criticize in any case is that hindsight has been a powerful factor in its conception: how else could the idea of a luring *Siegespreis* (the empire) have suggested itself? No source hints at such a thing. But this explanation is not even available for the strangest element in Meyer's reading of the episode. If really Themistokles' titanic struggle had dominated Athenian politics for ten years from 493 to 483 and had inspired the whole citizenry to such enthusiasm that they consented to play for the staggeringly high stakes Meyer alludes to (empire or total ruin), then one would have to

---

[8] Meyer's interpretation of course is not entirely novel: the notion that Themistokles' *aménagement* of Piraeus and his navy bill were part of one grand scheme that was directed against Persia is already to be found in Grote (V ch.XXXIX 52-53); in Curtius (II 16); and in Duncker (VII 94ff.); as also in J.B. Bury's *History of Greece*, first published in the same year as Meyer's third volume (1900: 263-264). In all these interpretations the assumption that Athens was somehow comparable to (early-)modern European powers seems to play a part. But no one of these scholars goes to such lengths as Meyer.

conclude that Herodotos on his interwiewing tours utterly failed to meet any one of the thousands of participants in this sensational game of high politics and allowed himself to be hoaxed into believing that Themistokles was a newcomer in Athenian politics in 483. Such a preposterous omission must of course lead to deep scepticism about the standing of the historian who perpetrates it, but of this there is no trace in Meyer's writing about Herodotos (he merely complains about Herodotos' *Gehässigkeit* vis-à-vis Themistokles: 1939: 227, 291 n.2[9]). His missing this obvious objection to his speculation is so unexpected that a very strong motive to believe in it and to overlook the implication must be supposed behind it. Such a motive is indeed not far to seek. It is at the same time the source of the speculation itself.

Meyer wrote the second and the third 'Bücher' of the third volume of his *Geschichte des Altertums* between summer 1896 and November 1900 (1939: X). Those were the years when Tirpitz' and the Kaiser's *Flottenpolitik* was in the centre of the political scene in Germany and certainly also in the public eye. Veritable publicity campaigns were organized in support of Tirpitz' *Vorlagen* and a national *Flottenverein* and 270 *Flottenprofessoren* played an important part in them. A recent study on *Wissenschaft*, politics and public opinion in the period concludes: 'In der Tat haben sie <i.e. the naval professors> wesentlich zum Umschlagen von einer weitverbreiteten Skepsis noch 1897 zum *Flottenenthusiasmus* 1900 beigetragen' (Vom Bruch 1980: 66 and n.46; my italics). Meyer was himself prominent among the campaigners and contributed a little essay to the *Umfrage* on the subject of Tirpitz' naval plans undertaken by the Allgemeine Zeitung (Munich) in spring 1898[10].

Now whereas Meyer nowhere as far as I know explicitly notices the similarity of the situation in Athens before the passing of Themistokles' bill in 483 and that in Germany before the approval of the second *Flottenvorlage* in 1900, it is evident that he describes Themistokles' 'long struggle' in terms directly borrowed from the contemporary scene. Several elements in his description of the supposed events in Athens *for which there is no ancient evidence* illustrate this: the enthusiasm of the citizens for Themistokles' naval plans, as if they were his *Flottenverein*; his aim to create a Greek navy, as if he were a Tirpitz; his aspiration to raise Athens to the rank of first power in the Mediterranean, as if he were a Wilhelm II; his strategy of *Entscheidungskampf*, as if he were a

---

[9] I fail to see that this *Gehässigkeit* is more than inability to anticipate Meyer's interpretation.

[10] This contribution was published in the *Ausserordentliche Beilage* of 12.1.1898 (p.4 no.26). See Marienfeld 1957: 110-115.

Schlieffen[11]; the spectre of the Persian threat hovering over it all as a prefigurement of British imperialism. It is evident that the contemporary situation served Meyer as a bed of Procrustes to rack out Athens to the size of a modern power, like he new-modelled the *polis* economy[12].

As I said, Meyer's doubly modernizing assessment of the *polis* world and of Athens in particular has been enormously influential and still is, as the treatment of the Helleno-Persian conflict in the new edition of *CAH* IV demonstrates, both in the perception of the Greek policy of the Persian kings, which is always seen as if they regarded Greece as a power like Saïte Egypt (which Athens and its league of course became after 479), and in that of the Greek capacities, especially as sea-powers. A particularly awkward aspect of the continued adherence to Meyer's model of explanation is Hammond's replacing of Meyer's nineteenth century analogue to Themistokles' navy bill by the preliminaries of the Second World War (when the situation was totally different and naval matters were not of central importance): 'Thus Athens, like Sparta, committed herself to total <!> war by an act of sacrilege <the supposed murder of the Persian heralds asking for earth and water>' and 'The effect of this run of ostracisms <487-483> was obvious. The Athenians chose their Churchill <!> not after but before hostilities began, and they were able to arm in time <other than the British in 1939>' (1988: 500 and 524). In one case the blind application of the 20th century model leads to downright nonsense: in an attempt to link the first ostracisms in Athens with a supposed anti-Persian party Ostwald suggests that 'the advocates of resistance <a suggestive term in this context!>, knowing that the presence of these men <Hipparchos and Megakles> in Athens would undermine any serious attempt at rearmament <!>, invoked the

---

11 See the discussions of German strategic thinking and of the preoccupation of the generals with *Entscheidungskampf* in Paret 1986, in particular the contributions of Rothenberg on Moltke and Schlieffen (esp. p.312f.) and of Craig on Delbrück (esp. p.341ff.).

12 There may be even more of such elements, e.g. the evident satisfaction with which Meyer notes that Themistokles, though an aristocrat, 'sich nicht den führenden Geschlechtern anschloß ... sondern selbständig sich einen Weg bahnte' (1939: 292), on which cf. Baumgart 1986: 53 ('In sozialpolitischer Hinsicht sollte der Flottenbau angesichts der Gespaltenheit des deutschen Volkes integrierend wirken, indem er alle Schichten, vom Grundbesitz über das Bürgertum bis hin zur Arbeiterschaft zusammenführen sollte zu gemeinsamer Erfüllung einer großen nationalen Aufgabe'). Perhaps we must also think of the irresponsible gambler's attitude ascribed to the Athenian people: are we here witnessing the prelude to the terrible game of "Sieg oder Untergang", which according to Golo Mann (1992: 624) was started by Ludendorff in 1916? And finally of the period of 10 years, for the passage of Tirpitz' second *Vorlage* in 1900 came at the end of the first ten years of the *Wilhelminische Ära*.

law of ostracism ...' (1988: 342, cf.344). Was there a Greek *polis* that had disarmed? And for the same reason as the European powers that came to be threatened by Hitler?

The effect of these three basic assumptions thus has been to make students receptive to very exaggerated notions about the Greek situation on the eve of Xerxes' invasion, especially the Greek naval potential of that moment, notions that have no support in the Greek tradition and are even directly contradicted by it. Nevertheless these assumptions are considered so certain that discussion is avoided and evidently deemed redundant.[13] This again has had a strong retroactive effect on the study of early shipping.

I shall for all these reasons consider the whole problem of Greek shipping in the archaic period afresh by analysing its development. I shall concentrate on some important elements in our evidence: ship pictures, chiefly geometric, insofar as they can be linked with the literary evidence[14]; some terms for the ships themselves and the names of the banks of oars of the trireme as used in the Athenian navy; the traditions concerning the Phokaian shipping activities in the West and Polykrates' attempt at thalassocracy; the developments leading to the invention of the trireme and the creation of the Persian navy of triremes; finally the introduction of this dreadnought into the Greek navies, especially the crucial decision of the Athenian *ekklesia* in 483 to adopt Themistokles' proposal to build a large navy of the type and the effect of this epoch-making event.

The basis of my argument will be Thukydides' sketch of the development of Greek sea-power, which I think is of fundamental importance and which until now has not been fully understood and for that reason has not been valued at its true worth.

---

[13] Witness the way the authors of *CAH* IV^2 totally ignore the alternatives to their interpretation of the Persian wars proposed in recent years, in the first place Will's *Le monde grec et l'Orient* of 1972, and also Nenci's *Introduzione alle guerre persiane* of 1958.

[14] This is to say that I shall ignore small galleys of the class of the later πορθμεῖα (see e.g. Hdt.VII 25.2; Xen.*HG* V 1.23; Str.VIII 2.1 C335. Cf. Drijvers 1992), such as (perhaps) Homer's σχεδίη and the small ship spurned by Hesiod (*Op*.643), no doubt an important category in local shipping. I shall not entirely ignore the evidence of the archaic pictures. The greater emphasis on the geometric ones simply results from my conviction that they illustrate more important developments. Indeed I am not sure that any important novelty can be seen in any archaic picture. However that may be, I do not intend to make the fault of the antiquarians and try to deal with all the preserved representations: very many of them simply have no independent value as evidence for my purpose.

CHAPTER TWO

THUKYDIDES AND EARLY NAVAL DEVELOPMENTS

According to Thukydides (I 13.4) important progress in the development of shipping resulted when Greece was in a better condition and became richer. Then tyrannies became established in the *poleis* generally. As a consequence the revenues of these *poleis* increased (formerly there had only been the specific perquisites of the traditional kingdoms[1]) and on this basis Greece fitted out navies and took more to the sea.

Tradition ascribed the first step to Corinth: the Corinthians were the first to take naval matters[2] in hand in nearly the modern fashion: very near to what Thukydides was conversant with (ἐγγύτατα τοῦ νῦν τρόπου: I 13.2). Evidence of the Corinthian lead he found in the tradition that the first Greek triremes were built there; in the indications he had that a Corinthian shipwright built four ships for the Samians, an event dated 300 years before the end of 'this war' (either the Archidamian or the Peloponnesian as a whole: see *HCT* I.122), i.e. *c.*721 or 704, roughly the last quarter of the eighth century; finally in the fact that the earliest known sea-battle was fought between the Corinthians and the Korkyraians, 260 years before the same epoch[3].

---

[1] Ἐπὶ ῥητοῖς γέρασι πατρικοὶ βασιλεῖαι is Thukydides' description of what he contrasts with the πρόσοδοι of the tyrannies. Γέρα must therefore stand for perquisites (*honoraria praemia, quae erant emolumenta sive reditus regum*: Poppo, Stahl), not for *Ehrenrechte* (Krüger), *Priester-, Richter- und Feldherrnwürde* (Classen, Steup). See Drews 1983: 8 and Carlier 1984: 234, who both wrongly take Thukydides' γέρα as 'prerogatives'. Carlier (p.255) no doubt is right in stressing that the terms τιμαί and γέρ(ε)α both 'associent les trois notions ... "pouvoirs", "honneurs" and "privilèges matériels"', but in Thukydides' context only the latter matters.

[2] Τὰ περὶ τὰς ναῦς is a rather vague phrase which accordingly must not be taken in a specific sense. It simply refers to *nautika*, the subject of the chapter.

[3] It is striking how cautiously Thukydides presents what may be called his new, i.e. non-Herodotean, evidence for the nautical developments in the period of three hundred years before his own times. The three items in this evidence, which he clearly brought together himself, are introduced with terms carefully graded in accordance with the reliability of the information: λέγεται ('it is said', 'there is a tradition'), φαίνεται ('it appears', 'there is evidence'), γίγνεται ('the fact is that there occurred'). This gradation here seems to have escaped commentators: only Classen, Steup comment on φαίνεται (in another context: 'mit Bezug auf das Zeugnis des Homer, der subjectiven Vermutung des δοκεῖ ... gegenüber; vgl. 1, 13,3 <read 13.2> ... wo ebenfalls eine schriftliche Überlieferung anzunehmen ist'). For λέγεται cf. Andrewes (*HCT* V.118): '... almost always used to suggest an inferior grade of certainty, whether because the story is a legend too old for checking ... or

Thukydides finds the explanation of the leadership of the Corinthians in Corinth's situation on the Isthmus: their *emporion*, which had always[4] been used for trade by land between the Greeks within and those outside the Peloponnese, was now used by maritime traders as well. When the Corinthians had acquired their ships and by this means had made a clean sweep of piracy, this *emporion*, now used for both land and sea trade, became even more lucrative and made Corinth a powerful *polis* (I 13.2-5).

The vital question raised by Thukydides' account is what precisely gave Corinth its leading position in matters naval. Was it an invention (or inventions) of a technical nature or something quite different? Most modern commentators have assumed the first. Classen, Steup, for instance, take 'in nearly the modern way' as referring to 'sowohl ... die Anlage von Häfen als ... die Zahl und Bauart der Schiffe'; Köster asserts that the invention of the *parexeiresia* 'war die große Neuerung, die die Samier veranlaßte, den Schiffsbaumeister Ameinokles um 700 v.Chr. aus Korinth zu berufen, damit er ihnen nach dem neuen System vier Kriegsschiffe baue' (1923: 108); and J.S. Morrison has repeatedly asserted that Corinth's lead was of a technical nature, indeed consisted in the invention of the trireme. According to Morrison Thukydides supports 'his assertion that Corinth was the first power to adopt modern naval methods' by making 'two separate points: first that she invented the *trieres*, and second that as early as 704 Ameinokles built four ships for no less a people than the Samians'[5]. In his recent study of the Greek *Technikverständnis* Schneider too interprets Thukydides' remarks on

---

for some other reason' and Schneider (1974: 133): 'daß Thukydides ... sorgfältig angibt, wo er einzelne Tatbestände nicht oder nicht genau in Erfahrung bringen konnte, und daß er sich nicht nur von Sagen und Berichten über weit zurückliegende Ereignisse ... mit einer Wendung vom Typ "man sagt ..." distanziert'. I shall speculate below (p.51 n.61) on what could have been Thukydides' evidence for Ameinokles' work for the Samians, and would emphasize that his certainty concerning the sea-battle between Corinth and Korkyra and its date ought to make us take his date seriously, just as those for Sicilian colonization. There is no strong argument 'for revising the date drastically' (cf. Salmon 1984: 218).

[4] This is called in question by Salmon: 'The land route across the Isthmus was probably not commercially important before the development of maritime traffic: transport by land was notoriously difficult' (1984: 133), but this unnecessarily assumes transport of bulk goods. For a thoughtful assessment see Will 1955: 75ff.

[5] *GOS* 158-159, cf. Lloyd 1972: 276ff.; 1975: 52ff.; 1980: 195. Lloyd brings Morrison's date down to the middle of the seventh century, claiming that 'it is evident that Thukydides firmly believed that the trireme was invented at Corinth in the time of the Kypselids' (1972: 277). In view of Thukydides' utter failure to mention the Kypselids this position verges on the absurd. There is no reason for Morrison's 'no less a people than the Samians': Samos' naval fame is of later times.

nautika (understood as *Flottenwesen*) as referring to the 'grundlegenden Verbesserungen im Schiffbau' (1989: 77, 108).

Thukydides himself has provoked such interpretations by placing the tradition concerning the trireme—however qualified—in the foreground of his elucidation of Corinth's leading role. Nevertheless, *pace* Morrison, he does not *say* 'that the *trieres* was invented in Corinth' (*GOS* 159), as Köster for instance clearly saw: 'Daß es <sc. Ameinokles' four ships> Trieren gewesen, sagt Thukydides ... nicht' (1923: 108), nor must one say, as Morrison does, that his testimony, taken in Morrison's sense, complements that of Herodotos. On the contrary, the combination of their testimonies must lead to the conclusion that the first introduction of the trireme into Greek navies should be dated to the third quarter of the sixth century, and preferably nearer to 525 than to 550, as has been cogently argued by J.A. Davison (1947: 24). Davison's arguments were almost wholly ignored by Morrison in *GOS*[6], but in my view are unanswerable. For Davison's reasoning is even better founded than he was aware of himself: the sea-battle of Alalia between the Phokaians and an alliance of Etruscans and Carthage (*c.*540-535[7]: Hdt.I 166) manifestly is the terminus post quem for the invention of the trireme, not merely for its introduction into Greek navies, as Davison thought. In this battle no triremes were used, while the tactical superiority of the Phokaians set their opponents a problem that could have been solved by using this type, if it had been in existence at that moment. The Etruscans and Carthaginians had to suffer Phokaian depredations for five years and only then were able to take the field with what they must have considered an adequate force (a double majority!) which evidently consisted of inferior ships. Their colossal preparation and subsequent failure prove that nothing better was in existence than the Phokaian ships: pentekontors with superior crews[8]. The interpretations I challenge, moreover, disregard an important aspect of Thukydides' testimony. When he terms the Corinthian naval methods 'very near the modern manner' (I 13.2), our interpretation of these words must depend on what he meant by 'the modern manner' and also by 'the ancient manner' (I 10.4). As soon as these questions are raised, it becomes clear that the modern interpretations make Thukydides contradict himself.

If the Corinthian lead was of a purely technical nature, 'the modern manner' should be understood as the technical level of the Athenian

---

[6] But see now Morrison 1979: passim and 1986: 41 n.14. It cannot be said that Morrison has grasped the decisiveness of Davison's argument.

[7] For the date of this battle p.75 n.33.

[8] For an explanation of the Phokaian superiority see ch.IV.1.

navy of Thukydides' own times, i.e. the exclusive use of triremes, and 'the ancient manner' as the absence of such ships: 'very near the modern manner' would then mean the *almost* exclusive use of triremes. This conclusion, however, cannot be squared with what Thukydides later says concerning the development in the use of the types of ship. He then (I 14.1) specifies the composition of the navies he has reviewed in the preceding chapter (the Corinthian, the Samian and the Phokaian) in comparison with those of the period of the Trojan war (τὰ Τρωικά) on the one hand and on the other those of the times of king Darius and after. According to him the former—of what we call the archaic period —did not differ much from the navies of Trojan times: 'there is evidence that these navies, although many generations later than the Trojan war, used few triremes, but were still equipped with pentekontors and long vessels (*ploia makra*) like the navies of that period'. In other words, as far as the ships were concerned, the navies of the archaic period were very near the ancient, and definitely not near the modern manner. Therefore, the nearly modern and the modern manners must have had another point, or other points, of resemblance.

In Thukydides' own times—in Athens this had been the case since Themistokles' navy bill had been passed—Greek navies practically entirely consisted of ships, chiefly triremes, that were the property of the *poleis*. This had not been the case in the times of the Trojan war (which for Thukydides clearly ended 300 years before his own times), for only thereafter the *polis* began to be established[9]. Accordingly, naval power of that early period was associated for him with the kings, Minos and Agamemnon in particular (I 4.1, 9.3). This view no doubt was based on a reading of Homer, just as modern interpretation of the Homeric data leads to similar views (see e.g. Gray 1974: G117): not only that there is no trace in *Iliad* and *Odyssey* of something like state-owned ships, but the Homeric ships are normally the property of the 'kings'. On his half-public mission Telemachos travelled in the ship of another Ithacan 'king' (*Od.*II 386/7), clearly because Odysseus had taken all the 12 (*Il.*II 637) royal ships with him. The situation in Ithaka is to be considered typical of the 'Trojan' period: the ships were in principle private property. But the early *poleis* also used the ships of private citizens.

In Athens there was the institution of the 48 (after Kleisthenes'

[9] The genesis of the *polis* cannot of course be exactly dated, but in view of the establishment by the middle of the eighth century of the aristocratic régime of the Bacchiads in Corinth (Salmon 1984: 56) and of similar developments elsewhere Thukydides' date may be taken to refer to it somehow.

reform 50) *naukrariai*[10]. In Pollux' words each *naukraria* furnished two horsemen and one ship (VIII 108), evidently for the defence against coastal raids. Both horsemen and ships must have been supplied to the state, as is implied in a late testimony which defines *naukraroi* as 'the men who supplied the ships, acted as trierarchs and were subordinate to the polemarch' (*Anecd. Bekker* I 283.20[11]). On the basis of the information concerning the Athenian *naukrariai* and considering that merchant ships had to be armed as long as the seas were made unsafe by pirates, Beloch has rightly concluded that the sea-powers of the archaic period chiefly consisted of privately owned ships[12]. It is true that the Athenian *naukrariai* are the only certainly known institution in this field: there are no more than vague indications that analogous organizations existed elsewhere, in Miletos and Eretria under the name of *aeinautai*[13] (for Corinth see p.00·). Even so, Beloch's generalization seems compelling to me. The situation in Greece thus appears to have been analogous to that in mediaeval England, where the state (i.e. the king) also used ships (armed merchantmen) of private citizens, either provided by the Cinque Ports under a charter of 1278, or directly required of the shipowners themselves (see Lewis 1957: 13ff.)[14]. It is

---

[10] For the Athenian *naukrariai* see Kahrstedt's excellent aperçu (1934: § 84, p.245-249); also Hignett 1952: 67ff., 129; Bravo 1977: 26ff., Vélissaropoulos 1980: 14-21.

[11] This information of course goes back to older lexicographical work: see Schmid, Stählin II 2.1093 n.3 and Gärtner in *DKP* III 610ff.

[12] 'Auch mußten ja, solange das Meer von Piraten wimmelte, die Handelsschiffe bewaffnet sein, und die ältesten griechischen Kriegsflotten haben ohne Zweifel aus dem Aufgebot solcher bewaffneten Handelsschiffe unter ihren ναύκληροι bestanden' (1913: 322). Curiously enough Beloch does not seem to have grasped the implications of his insight.

[13] See Vélissaropoulos 1980: 21ff., esp. 26; and Bakhuizen 1990: 13ff. I cannot share Bakhuizen's view that the *aeinautai* were fifth- and fourth-century organizations of professional oarsmen.

In his otherwise excellent digression on the *naukraroi* and *aeinautai* (1977: 26ff.) Bravo labours under the same misunderstanding as Vélissaropoulos (and many others), viz. that these corporations built and maintained *warships* for the state. Bravo even asserts that they owed their title to this and expressly denies that these rich nobles could have been called *naukraroi* or *nauklêroi* by reason of their possessing merchant ships, because 'ils ne voyageaient pas dans ces navires, n'étaient donc pas des "chefs de navire" dans la sphère privée, économique' (1977: 29). In view of the strictly non-naval context in which the *nauklêros* functioned I consider this an indefensible position; the implication that *naukraroi* possessed both warships and merchantman surely does not make it more attractive. This anomaly in itself pleads for the view that the naukraric ships were merchant (or general purpose) galleys usable for naval tasks.

[14] Starr (1989: 28) misleadingly makes the analogy more specific by asserting that the *naukrariai* were coastal districts. For this view there is no good evidence. From the time they became a state institution the network of the *naukrariai* must have covered the whole of Attika, not the coastal fringe alone. This made them suitable for the (no doubt secondary) fiscal task ascribed to them by Aristotle (*Ath.*

significant that as great an authority as Kahrstedt has even contended that until 483 Athens had the disposal of naukraric ships only (1934: 246) and, although this view is hardly tenable, it is easy to see how he came to hold it. Before 483 the evidence for state-owned Athenian ships, as for state-owned ships in general, is poor indeed. Still it is unmistakable.

In the time of the battle of Marathon Athenian sea-power consisted of at least 50 ships. Herodotos relates that in those years the Athenians did not feel strong enough for the war against Aigina and purchased twenty ships from Corinth, which brought the total Athenian strength to 70 (VI 89). But in his report on the hostilities that had taken place before that transaction he says that one Athenian ship—θεωρίδα νέα (VI 87)—had been taken by the Aiginetans. 51 therefore had been the minimum strength. The figure of 50 was explained by Wilamowitz (1893: 165 n.52) as the addition of 48 naukraric units and two other ships, the latter identified with the well-known sacred triremes (ἱεραὶ τριήρεις) *Paralos* and *Salaminia* (in Wilamowitz's words 'die zwei, welche der gauverband der Παραλία ... und die kleruchen von Salamis zu stellen gehalten waren'). This no doubt is correct. The sacred ships were in regular use for such official tasks as the transportation of ambassadors, *theôroi* etc. The *theôris naus* captured by the Aiginetans is therefore to be considered as belonging to this category[15]. It is probable that originally there were no more than two of these sacred ships. This follows from Philochoros' report, clearly referring to the end of the fourth century, that there were then four sacred triremes, two new ones: *Antigonis* and *Demetrias*, and two others (the latter are specified as πρώτας 'the original ones'), *Ammonias* and *Paralos* (the first of which had replaced the *Salaminia* in the times of Lykourgos)[16]. At the time of Sokrates' execution there was another ship that will have been 'sacred': Plato in the *Phaedo* calls it 'the ship' (τὸ πλοῖον: 58a7). In this ship Theseus was said to have sailed to Crete with the 'twice seven'. Plutarch specifies it as a triakontor (*Thes.*XXII 1) and it served as the *theôris* for the Delian *theôria*[17]. If this ship was in existence in the early fifth century

---

VIII 3) and Hesychios (*s.v.* ναύκλαροι) and explains the central administrative function of their foremen (the πρυτάνιες τῶν ναυκράρων) implicit in Herodotos' account of Kylon's coup (V 71). In this fiscal/administrative context they may have become local divisions (the term is used by Hignett 1952: 68), but in origin they must have been the personal *Gefolgschaft* of (aristocratic) shipowners (who of course lived near the coast): to judge from the smooth way in which it was called up Telemachos' crew (*Od.*II 383-385) may have had this character.

[15] See *GOS* 247 and Jordan 1975: 153ff, who gives the evidence in full.

[16] See Philochoros *FGH* 328F48 and Jacoby's commentary.

[17] See J.Burnet 1911: 58 and cf. Wilamowitz 1893: I 208 n.38: '... dem dreißigru-

(as is probable enough in view of its reputation of hoary old age), it may be taken as the second sacred ship of that period[18]. An early testimony for the existence of 48 + 2 Athenian ships is perhaps the Athenian *lemma* in Homer's Catalogue of Ships (546-556), where 50 ships are ascribed to Menestheus[19]. However that may be, sacred ships must have been state-owned: there is no evidence whatever to the contrary[20].

The evidence for Athenian state-owned ships before 483 is no doubt tenuous: hence Kahrstedt's radical disregard of it. However, even if the sacred ships are discounted, it is undeniable that the *polis* Athens had its own ships before that year. This is made certain by Herodotos' account, just mentioned, of the purchase by the Athenians (the *polis*!) a short time after (or before[21]) Marathon of 20 Corinthian ships. This tradition, moreover, implies that the ships had been the property of the *polis* Corinth: the Corinthians practically gave away the ships, which naturally they could not have done if the ships had been private property. Also the fact that a Corinthian law forbade to make a gift of them points in the same direction (see p.26f.). Finally there is still another sign that state-owned ships were a normal occurrence in the archaic age, at least during the later stages of that period. As I shall demonstrate later (p.47), our tradition concerning the pentekontor definitely associates this type of ship with the *polis* and I shall argue that its properties—although it was not a full-fledged warship—made it pre-eminently useful for the state: pentekontors will for that reason often, perhaps very often, have been state-owned ships, and state-owned ships perhaps normally pentekontors.

The archaic age, which witnessed the rise of the *polis*, not unnaturally also saw the institution of *polis* navies. When the evolution of early Greek sea-power is viewed in this light an organizational development stands out: in the beginning only privately owned ships, among

---

derer des Theseus ... der nur rarität war'.

[18] According to Jordan 'Athens possessed many more sacred vessels than the *Salaminia* and the *Paralos* ... in her classical period' (1975: 155). This is pure fantasy.

[19] See Jacoby's commentary on *FGH*323F8 at n.10. In his commentary on the *Iliad* Willcock emphasizes the unimpressiveness of the Athenian entry and suggests that there is no question of 'patriotic enhancement in it'.

[20] See Wilamowitz (1893: I 208 n.38): 'da die staatsschiffe <= sacred ships> durchaus auf kosten des staates armirt und bemannt werden'.

[21] For a discussion of the chronology—a very thorny problem—see Busolt 1895: 644 n.3. He notes with approval that a date after Marathon was preferred by the foremost scholars then, as it is now (see Bengtson 1969: 167 n.3). Nevertheless there is something to be said for the alternative: if the Athenians bought the Corinthian ships before 490 that would help to explain both the Persian attack of this year and Miltiades' otherwise unbelievable 70 ships (Hdt.VI 132), as also the Aiginetan readiness to give earth and water to Darius (Hdt.VI 49).

them the king's, were available; when the kings disappeared[22], the new *polis* had to take over their military functions, in particular their function as suppliers of ships for public tasks, without for the time abandoning the contribution of private shipowners; at the close of the archaic age —just before Xerxes' expedition—navies came into being which consisted of state-owned ships exclusively, or nearly so[23].

In other words: the period between *c.*750 and *c.*480 is characterized in the maritime sphere by *two* developments: one purely organizational and leading up to the increasing use of state-owned ships; the other predominantly technical in nature and having to do with the successive improvement and specialization of the ships themselves, the two developments surely being interconnected. It is my conviction, however, that Thukydides' account (I 13-14) has the first development as its subject, the one which most clearly progressed in three stages.

The reason why this account has been misunderstood must be that the terms Thukydides uses in referring to the technical development are clear-cut and suggestive: the combined use of *ploia makra, pentekontoros* and *trierês* implies development. Such clear indications for the other development—the use for instance of terms like 'state-owned ship' or 'state navy'—evidently were not supplied by Thukydides' informants. Nevertheless the distinction between state-owned and privately owned ships is implicit in Thukydides' summary of their information.

In the first place the ships of the Trojan period (Homer's times) are described as 'ships equipped in the ancient fashion, more like pirate craft' (I 10.4). According to Classen-Steup Thukydides in this way distinguishes these ships from 'einer anderen Gattung von Fahrzeugen ... den Kriegsschiffen'. With this view (provided Kriegsschiffen is taken in the sense of state-owned ships) I am in complete agreement. What Thukydides wants to make clear to his contemporaries is that, compared to the sort of ships used in his own times for operations like those

---

[22] I am less sceptical concerning the kingship in geometric Greece than Drews (1983: Conclusion p.129-131), but for the problem under consideration the kingship in the strict sense is not a condition: the point is the prevalence of privately owned ships, or rather the absence of state-owned ships.

[23] In Athens there were during the fifth and fourth centuries some private persons who owned triremes: the most famous of these is the Kleinias—Alkibiades' forbear (*APF* 600 V)—who won the prize for valour at Artemision (Hdt.VIII 17).; Others are Perikles (Plu.*Per.*XXXV 2), Alkibiades' himself (Th.VI 50.1, 61.6) and one Makartatos (*APF* 2921.XII) who bought a trireme and took part à titre personnel in the fighting between Sparta and a Cretan *polis* at some time early in the fourth century (Is.XI 48). According to Herodotos one of the participants in Dorieus' colonizing activities, the Krotoniate Philippos, had his own trireme (the crew of which he paid himself: V 47.1). This is clearly a survival of the naukraric ships.

of the Trojan war, a category he labels *kataphanktos* (κατάφαρκτος 'provided with vertical defenses': I 10.4), the Homeric ships were rather like the pirate craft of the late fifth century. This comparison may have suggested itself to Thukydides because the Athenian readers, for whom he wrote in the first place, were no longer familiar with the phenomenon of what we should call armed merchantmen: in Athens and its empire, as earlier in the Persian empire, so many specialized warships were available that they had completely ousted the merchantman from the field of naval action. For these readers, in other words, comparison with pirate craft was more illuminating than the direct mention of the armed merchantman, for which no specific term was available[24]. Such ships will have differed in many respects from warships, i.e. they will have been far less fitted for regular fighting at sea and not *only* because they were not *katapharkta*. It is such ships, a category that still had some strategical significance in Thukydides' own times (see p.25f.), which he epitomizes as 'equipped like pirate craft'.

In the second place the distinction between the ships of the *polis* and armed merchantmen eventually to be added to its naval forces explains Thukydides' curious characterization (I 14.3) of the navies of Aigina and Athens of the last years of Darius' reign as 'of no account' (βραχέα, 'von geringer Ausdehnung und Bedeutung' in Classen, Steup's rendering). For unless allowance is made for the distinction under consideration, this characterization must be rated absurd[25].

According to Herodotos Aigina and Athens both commanded a naval force of *c.*70 ships around 490 (VI 89 and 92). Thukydides uses the term βραχέα in a comparison of these sea-powers with those of the Sikeliots and Korkyraians in the first place, navies chiefly consisting of triremes already at that moment (I 14.2). But a few lines earlier he defines the sea-powers of the Ionian *poleis* Samos and Phokaia as 'important naval forces' (πολὺ ναυτικόν: I 13.6) and adds that with the Corinthian navy they were 'the mightiest of the sea-powers' (δυνατώτατα τῶν ναυτικῶν: I 14.1). Now these were sea-powers of the same order of magnitude as those of Aigina and Athens: in the battle of Alalia of *c.*540 the Phokaians of Corsica had 60 ships (all pentekontors: Hdt.I 166.2) and a short time after his *Machtergreifung* Polykrates

---

[24] Although for Thukydides (and his informants?) *ploion/-a makron/-a* may have come near to having that sense.

[25] Bremmer's judgment that 'the few data we possess do not appear to indicate that the pentekontor was a ship of frequent occurrence in the archaic period' (1990: 4) is eminently reasonable (if Samos and Phokaia are excepted). His reading of '*fleets of pentekontors* of the Athenians and Aiginetans' into Th.I 14 is an obvious inadvertency.

acquired 100 pentekontors (Hdt.III 39.3). In comparison to these sea-powers the naval forces of Aigina and Athens may have been weaker, but could not be called insignificant.

The explanation of this paradox is to be found in the immediate context: Thukydides compares the navies of Aigina and Athens with those of the Sikeliots and the Korkyraians. By 485 these consisted of triremes, i.e. state-owned ships, for the most part (ἐς πλῆθος: I 14.2). These naval forces thus had become wholly different from those of Aigina and Athens. In the latter, the state-owned ships were a (small) minority: in Athens 20 out of a total of 70 in *c.*490 and a short time before even no more than 2 out of a total of 50 or 52. Compared to the navies of Korkyra and other western Greek *poleis* the state-owned navy of Athens was insignificant indeed, and so will have been the Aiginetan.

These navies were still insignificant in the eighties of the fifth century. There is no reason to assume that their distant predecessors had been different: if the ships Ameinokles built for the Samians in *c.*720-700 were built for the *polis* Samos, as is the obvious interpretation of Σαμίοις in Th.I 13.3, the resulting navy of four ships compares favourably with that of Athens. Nor is there any reason to suppose that these navies were the only ones of their kind: Megara, Epidauros, Hermione, for instance, cannot be supposed to have had more numerous navies than Athens or Samos, and the same can be said of most of the Greek cities in Asia Minor, none of whose navies, several or in combination, are mentioned by Herodotos in his report on the efforts to organize their defence in 546 (I 141ff.).

On the other hand we are not compelled to reduce all archaic sea-powers to an identical pattern of small state-owned navies and (much) larger 'naukraric' fleets. In theory *poleis*, even those of the archaic period, had the choice between this naukraric pattern, which would imply heavy personal and financial demands on a small number of owners of naukraric ships, and an alternative one which spared these men specific financial efforts, and relied on more general taxation to enable the *polis* to build its own ships in greater numbers. In practice all will have depended on the capabilities of the particular *poleis*. If a government was strong and if public income could be increased sufficiently, the alternative just mentioned was feasible, otherwise not. There is, moreover, a technical aspect which will have influenced matters. The building by the *poleis* of their own ships will have entailed some technical specialization. As I shall argue below (see p.53), the naval authorities are likely to have drawn up specifications, both to

ensure superior speed against pirates and protection for the crews (the provisions Thukydides summarizes in the term *katapharktos*: I 10.4). Especially the first requirement will have been important: pictures on geometric vases of the mid-eighth century show that by that time the addition of a second bank of oars had become a possibility (see p.53ff.). But as soon as a *polis* availed itself of that possibility, the simultaneous use of the resulting *dikrotos* ships with other, *monokrotos*, types entailed problems of co-ordination. *Polis* authorities will then have tended to reinforce the *polis* navy at the expense of the naukraric ships, and will have done so if the *polis* was inclined to an active naval policy and could afford it. There are several indications that this was done in Corinth.

1. The fact that a Corinthian shipwright was employed by Samos to build its navy, probably means that this man was invited because he possessed technical knowledge of the type to be built, rather than extraordinary skill[26]. This may well mean that Corinth was the first *polis* to build the katapharkt pentekontor which Thukydides probably considered typical for his 'almost modern' navies (I 13.3 and 10.4).

2. Around 490, right at the end of Thukydides' second phase of naval development, Corinth was able to give away twenty of its ships to Athens (Hdt.VI 89). This must mean, and will have been taken by Thukydides to mean, that the navy of the *polis* Corinth at that time had a strength of at least forty and probably even more ships (to which we must add an at least equal number of naukraric ships)[27]. Compared with the Athenian navy of two state-owned ships this was colossal.

3. This conclusion concerning the strength of the Corinthian navy is confirmed, and its frame of reference vastly extended in time, by the tradition that Corinth waged a naval war against Korkyra 260 years before Thukydides' own times (I 13.3). The ability to operate so far from one's base—for it is evident that this battle must have taken place in Korkyraian waters[28]—presupposes the long-term availibility of the naval forces. Long-term availability, however, is not to be expected of

---

[26] There is no reason to make him 'a notable inventor' (Gomme, *HCT* I.122), and even less to ascribe a specific invention to him, as does Köster (1923: 108).

[27] In this perspective Starr's verdict (1989: 27), that 'Corinth had a fleet <!> of some 70 ships by the end of the sixth century' is misleadingly definite. Since there is no numerical evidence on which to base such a view, it probably is inspired by the traditions concerning the Aiginetan and Athenian fleets of 70 ships (Hdt.VI 89, 92.1 and 132): but these fleets were of a different character altogether. Corinth's entire naval arm—*polis* navy and naukraric ships taken together—may well have been much stronger than 70 units.

[28] If the battle had taken place near Corinth, Thukydides no doubt would have ascribed the naval lead to Korkyra.

naukraric, i.e. mostly merchant, ships. Thukydides, by the way, may well have considered this battle as conclusive evidence for Corinth's early naval greatness, because he assumed—and his informants probably said straight out—that it was comparable to the battles of Leukimme and Sybota (Th.I 24-55) in strategic scope and specifically in number of ships. That will indeed have been a natural assumption for a contemporary of the naval actions of the later Peloponnesian War, when the scale of naval operations was even larger.

4. In the naval battle of Sybota, which is described very fully by Thukydides (I 48-51.3), both the Corinthians and the Korkyraians applied a tactical concept that is likely to have been evolved in a situation where specialized state-owned ships were used in combination with less- or non-specialized naukraric ships. The progress of this battle amazed Thukydides, because there was no question of the ***diekplous*** tactics normally applied (and expected) by fifth-century Athenian naval experts. Thukydides says that the left wing of the Corinthian order of battle was occupied by the Corinthians themselves[29] and that it was very successful; on the other side a Korkyraian squadron of twenty ships also did well and even sacked the enemy camp (I 49.6 and 5). It is clear that the squadrons in question were understood by Thukydides as striking forces: he implies that the Korkyraian one, after carrying the day on its own left wing, ought to have come to the rescue of the right (which was in dire straits 'because those twenty ships from a force already inferior in number had not come back from the pursuit': 49.6). Of the Corinthian squadron he expressly says that the ships were the best-sailing (48.4), i.e. that they had larger crews (see p.179ff.), and the same may be assumed of the Korkyraian one.

In these fleets all the ships seem to have been triremes[30] and differentiation in speed must mean differentiation in degree of manning: but since both fleets no doubt were far undermanned overall (see p.173), there is nothing impossible in Thukydides'report. But his evident amazement at the battle-tactics demonstrates that the routine of the Corinthian navy was quite different from that of its Athenian counterpart.

---

[29] This left wing most probably consisted of only part of the 90 Corinthian ships, as is persuasively argued by Gomme (*HCT* I.184): 'at first sight it would seem that their fleet was divided into three very unequal divisions (39 on the right, 21 in the cenre, 90 on the left: 46.1) ... This is improbable in itself, if they were tactical divisions; and ταῖς ἄριστα τῶν νεῶν πλεούσαις suggests that only some of the Corinthian ships, the best sailers, formed the left wing ...'.

[30] The fact that Thukydides does not mention, or even suggest, that other types were used seems decisive to me.

This different way of fighting at sea, which I suggest was typical of archaic naval warfare[31], is attested in other actions of Peloponnesian fleets as well. When in 429 two fleets successively confronted Phormio at Naupaktos, ships described as 'best sailers' (ἄριστα πλέουσαι) are mentioned in both: first 5 out of 47, then 20 out of 77, the five described as a tactical reserve, the twenty detailed as a striking force to keep Phormio from reaching Naupaktos (Th.II 83.5 and 90.2). In both these cases one is tempted to infer that the fleets still consisted of a combination of state-owned ships (presumably triremes) and naukraric ships. This may seem absurd, because it is considered self-evident that since the appearance of the trireme no other type was used in Greek naval warfare[32]. Such an assumption is belied, however, by the provision in the text of the armistice proposals (made by Sparta) which were part of the negotiations to end the Archidamian war (Th.IV 118.5) and forbade the Peloponnesians to put to sea in long ships or in oared vessels with a tonnage of more than 500 measures (ἐς πεντακόσια {τάλαντα} ἄγοντι μέτρα)[33]. On the basis of this important (and completely neglected) piece of evidence it can be inferred that the Peloponnesian sea-powers had lagged behind the Athenian naval establishment on all counts and had retained the kind of organization that had been abolished in Athens with the passage of Themistokles' navy bill, and still combined specialized naval units (triremes *and* pentekontors, hence the unspecific phrase) with naukraric ones. In my view Thukydides' description of the naval preparations and the operations in the war between the

---

[31] I suggest that the striking forces involved had their counterparts in the *logades* of hoplite organization: see Singor 1988: 270ff. The fact that Thukydides can compare the tactics of Sybota to an infantry battle (πεζομαχία: I 49.2) does indeed suggest that such striking forces were a regular feature of hoplite tactics too.

[32] 'Heavier, more powerful, and capable of carrying more ἐπιβάται, but making greater demands on timber supplies and manpower, the trireme not only rendered obsolete all existing Greek line-of-battle ships ... Similarly, the completion of H.M.S. *Dreadnought* rendered all "pre-Dreadnought" battleships obsolete' (Davison 1947: 18 and n.1). Davison, it must be emphasized, is careful not to overstate his case: he does not exclude the possibility that second-rank powers maintained the older types, as was evidently the case.

[33] See Wallinga 1964: 36ff., where the athetizing of τάλαντα is defended. The argument which turns on μέtra being used with the sense of 'μέδιμνοι and/or μετρηταί' appears to be stronger than I realized in 1964, since the term is actually used in this sense in Arist.*Ath*.VII 4: 'a man was assessed as a *pentakosiomedimnos* if from his own property he made 500 measures, dry and wet taken together' (cf. Sandys' note). 500 measures, by the way, will have been more or less equivalent to 50 m^3 (see Wallinga, *l.c.* p.19ff.), which indicates a hold of roughly 14x3x1.25m and would fit a pentekontor (see p.50). The fact that the term pentekontor was not used by the proposers of this article may well mean that it was their aim to include all galleys of pentekontor size.

Corinthian alliance and Korkyra implies that these *poleis* were not quite so backward and at any rate no longer employed naukraric ships[34], but *tactically* they remained old-fashioned as if they still employed these obsolete craft (cf. Th.I 49.1[35]).

In other words, the tradition concerning the battle of Sybota confirms and reinforces what can be inferred from the other data, namely that Corinth up to that moment was by far the most important naval power in Greece after Athens. Its tactical detail also suggests that even the Corinthians once had employed naukraric ships. This conclusion in its turn finds support in Herodotos' account of the 'lend-lease' transaction beween Corinth and Athens (VI 89), which I mentioned earlier.

5. On this occasion the Athenians had asked the Corinthians to lend them ships: the Corinthians had wanted to make the ships a free gift, but could not because their law did not allow this. This law is intriguing[36]. Herodotos does not say, nor is it probable, that it applies to this situation only, that it had, in other words, been passed for this occasion: its existence rather implies that sales of ships by the state were a regular occurrence and that the law regulating such sales was applied to this particular transaction. If so, the question is to what kind of sale the law was normally applicable. Not presumably to the transferring of naval ships to other *poleis*, for that must have been altogether exceptional: we do not, at any rate, meet with any other instance of it in our evidence. The law must therefore have applied to sales within the *polis*, presumably to Corinthian citizens[37]. This in my view is only to be

---

[34] Thukydides could hardly have failed to mention this had they done so.

[35] I have little doubt that this tactical backwardness has to do with the high cost of regular training with fully-manned galleys, especially triremes. Bremmer (1990: 4-5) most aptly quotes Philistos' vignette of the pentekontor as a 'gluttonous feeder' (*FGH* 556F68: ἀδηφάγον πεντηκόντορον, explained by Harpokration *s.v.* ἀδηφάγους τριήρεις (clearly as notorious a category) as τὰς ἐντελομίσθους <!> καὶ πολλὰ ἀναλισκούσας). See p.69ff. on the reason why the Phokaians could overcome this difficulty, as they evidently did.

[36] According to Salmon Herodotos' account 'raises interesting possibilities; but we do not know ... whether the *nomos* was a formal law or a custom ...' (1984: 251 n.41). This is a thoroughly unsatisfactory comment: the interesting possibilities are not specified, nor is it explained what difference the alternative meanings of *nomos* would make in this case. As far as I have been able to ascertain, no commentator has here taken *nomos* in the sense of 'custom', which in my view is excluded by the negative context (δωτίνην γὰρ ἐν τῷ νόμῳ οὐκ ἐξῆν δοῦναι: 'to give the ships away was forbidden by law'). Cf. the cases where ἐξεῖναι and νόμος are associated (Hdt.II 113.2; III 31.4; V 75.2). On the meaning of *nomos* in Herodotos see Heinimann (1945: 79): '... für Herodot ist noch jeder νόμος von schlechthin verpflichtender Autorität für die jeweilige Gemeinschaft, bei der er gilt ...'.

[37] Commentators do not seem to have seen this possibility and appear to be embarrassed by the episode. Macan (1895: I 347) makes the fantastic suggestion that the law was 'designed to protect Corinthian commerce or, perhaps, to keep some

expected. For however high public revenue may have been in Corinth, it cannot have been a matter of indifference to the authorities whether their investments in ships were entirely à fonds perdu or not. As long as the ships of the *polis* were similar to those in private hands, it was possible for the naval boards to scrap ships and sell them to private shipowners, *naukraroi* that is. If the ships were sold after not too long a period, they not only could fetch a good price, but in the hands of the *naukraroi* could still serve the *polis* for a time. The proceeds could be spent on new ships and on maintenance.

Thus the benefit to the *polis* was multifarious: its own ships did not deteriorate with age; cost of repair would be reduced; the units converted into naukraric ships would be similar to, and for that reason easier to use in co-ordination with, the specialized state-owned ships. In the long run very many, indeed nearly all, could have become of pentekontor class in this way. Conversely, the *naukraroi* will have profited too, provided that the ships were sold at a moderate price: for though as original naval vessels they had not been built to merchants' specifications, they would be fast and handy ships and no doubt in better repair than private ships of their age. It is in this perspective that the Corinthian law is particularly interesting. It would seem that here in the past prospective buyers of scrapped ships had brought pressure to bear upon the authorities to forgo the price: no doubt they could argue that the advantages just enumerated were sufficient to make such a deal profitable to the *polis*, even if it did not cash in on the ships. Also, the buyers as *naukraroi* must have been influential in any case and may all have belonged to the oligarchy. Nevertheless they were resisted, and apart from purely financial grounds, this may well have had political reasons. The Corinthian oligarchy evidently was a moderate one, which carefully considered public opinion[38] and may well have avoided for that reason openly to subsidize its own members. Even so the *naukraroi* will certainly not have been fleeced: the law forbade to give away the ships, not to sell them cheaply.

It is conceivable that the organization of Corinth's navy on Thukydides' 'nearly modern' lines was triggered off by the expansion of its trade with the western colonies. When this led to the regular movement of grain in bulk, shipowners will have been tempted to deck

---

secrets of Corinthian ship-building dark', as if naval galleys could have been an important article of export (and the law intended to prevent dumping them?) and as if selling them cheaply kept the buyers from noticing the technical secrets! This wrong track is also followed by Van Groningen (1950: 181).

38 See Salmon's judicious discussion (1984: 236f.).

in their galleys, and even to change over to the *eikosoros*, to be able to participate in this trade and to take on bigger cargoes. From the point of view of the naval authorities this was not a desirable development, the ships becoming even less employable in co-ordination with the state pentekontors than *ploia makra* in general. Such a development may therefore well have led to the decision to expand the *polis*' own specialized navy.

If Corinth's navy was organized in the way described, it is probable that the ships of the Corinthian *naukraroi* were mobilized only sporadically, operations at sea being normally carried out by the state-owned ships, as is indeed suggested in the tradition that Corinth put down piracy 'when the *polis* had acquired its navy' (τὰς ναῦς κτησάμενοι: Th.I 13.5). The Corinthian tradition further implies that such a practice went back to the eighth century[39]. Thukydides was sufficiently impressed to accept this. His verdict that in naval matters the Corinthians were the first to adopt modern methods, may therefore be taken as signifying that the Corinthians were the first to *almost* abandon the use of naukraric ships. Thukydides will have been particularly impressed by the precocity of the Corinthian development: of the two archaic sea-powers he considered comparable—Polykrates' Samos and the Phokaians—the former's great navy dated back no further than the late forties of the sixth century at the earliest[40] and the second not necessarily much further than 560 (see p.75n.33).

From Thukydides' distant point of view these three sea-powers must nevertheless have seemed sufficiently alike to group them together and to present them as the vanguard of the archaic *nautika* of the Greek world, and in a sense they certainly were. All the same, the economic basis of the two Ionian powers appears to have been quite different from that of the Corinthian one (see ch.IV). Corinthian sea-power was unique in that it was based on Corinthian capabilities alone. Also, there is, as I have intimated (p.22), no reason to suppose that it was typical for archaic sea-powers in its organization. If Thukydides' characterization of the Corinthian naval arm as 'almost modern' means that it depended on

---

[39] Therefore Strabo's assertion that Corinth's Bacchiad rulers began the fearless exploitation of their *emporion* (VIII 6.20 C378) may be considered to derive from, or to elaborate, the same tradition. It is severely questioned by Salmon: 'the passage is ... probably a construction of Strabo or his source, based on the evident riches of the Bacchiads and Corinth's later commercial importance' (1984: 74). I consider this as all too critical.

[40] See the discussion of the chronology of Polykrates' tyranny by Busolt (1895: 508) and Berve (1967: II 583). I am convinced that Polykrates' coup had to do with Egyptian power politics after the Persian conquest of Lydia, that is after 546 (see Wallinga 1987: 60ff. and below, p.85ff.).

state-owned ships all but exclusively, it was very different from its Athenian counterpart. It was the latter that must have been representative of the general run of archaic sea-powers: that is implied in Thukydides' finding that the latter were characterized by the use of both pentekontors and *ploia makra*, like the sea-powers of Homer's times (I 14.1). This contrasts with Corinth's modernized naval arm, which must have consisted of pentekontors almost exclusively. The contrast was sharpened by the circumstance that the *ploia makra*, as I shall demonstrate in the next chapter, were a heterogeneous category, ranging from former state-owned pentekontors and possibly even longer ships, to smaller *monokrotos* galleys.

My conclusion is that all navies of the archaic period were organized in the manner described, with Corinth at one (extreme) end of the scale—'almost modern in organization'—and *poleis* like Athens at the other[41]. Of course this conclusion is hypothetical, but as a hypothesis it is more broadly based than current theories such as for instance Morrison's, which leaves the naukraric ships out of consideration and starts from a simplistic definition of the 'warship' and the wildly improbable premise that in Greece 'warships' and 'navies' were a phenomenon that went back to the earliest times[42]. My hypothesis, moreover, is far more in accordance with what has been called the 'new orthodoxy' in Greek economic history, which stresses the modest scale and the limited development of the archaic economy (see p.8 at n.7), than the alternative just mentioned. Finally, the analogous development of early modern shipping, especially the late disappearance of the merchantman as an important element in naval power and the late development of the pure warship (see e.g. Lewis 1957: ch.4 and 6; Parker 1988: 99ff.), makes it even more cogent.

Incidentally, the case of Corinth's naval arm is interesting for a very special reason, namely that it may be the analogue of the contemporaneous Phoenician navies. Of these navies, one must insist, hardly anything is known. In the next chapter I shall show that up to the time

---

41 Unless there were *poleis* that used naukraric ships exclusively. This cannot be ruled out.

42 See e.g. Morrison, Coates 1986: 25: 'The earliest use of the oared warship is described in the *Iliad*: the transport of men and their warlike gear to a scene of armed conflict on land. This seems to be the intended role of the long ships represented by the Naxos lead models of 2500 BC, the oared ships shown on the Syros "frying pans" of a little later date, the late Minoan III ship of 1400-1200 BC, probably a one-level pentecontor on the Cretan larnax, and the Mycenean ship on the pyxis from the Pylos Tragana tomb of 1400-1200 BC'. Here the implied definition of warship is very unsatisfactory: any long ship is taken as such. The pictures mentioned contain no clue whatever for the function of the galleys represented.

of Luli II, the king of Tyre who had to flee for Sennacherib's attacks in *c.*702, the development of the Phoenician galleys had not been different from that of the Greek, as the one reliable datum (Ill.19) proves. However, concerning the organization of these navies, the degree of their relying on merchant ('naukraric') galleys, and the fiscal organization needed to maintain them, we have no information at all. Accordingly, the current belief that the Phoenician cities possessed large standing navies, which in the event they had to put at the disposal of the Persian king, is no more than adventurous speculation. In theory, one may conjecture that the Phoenician navies were organized in a way which was different from the Greek on all counts. If they were, it is very unlikely that we shall ever know anything for certain about this organization, but surely such a conjecture would be far-fetched. Since the Phoenician cities were not unlike the Greek *poleis,* a resemblance which became more pronounced with time (see Harden 1962: 79), it is more reasonable to assume that their early navies more or less matched the Greek ones, particularly that of Corinth, the *polis* most resembling them in economic development. If really Sidon furnished a sizable fleet to function as the most prominent of the Persian peace-time patrols (Hdt.VII 99.3: see Wallinga 1989: 174ff.), that may have been possible because Sidon, like Corinth, had a considerable standing navy of old.

On this general view regarding the early navies the interpretation of Thukydides' report that Corinth was the first *polis* in Greece to build triremes as signifying the invention of the type by a Corinthian, and the dating of precisely this event to Thukydides' '300 years before this war'—however this date may be 'corrected'—will be seen to be quite untenable. The adoption of this expensive and personnel-devouring leviathan would have disrupted (as later it undoubtedly did in the smaller *poleis,* although our 'Athenian' sources do not talk about it) the whole organization of the sea-powers concerned and made the cost of the *polis* navies disproportionate. Of course, when the Athenians decided in 483 to spend their new-found silver on a huge fleet of triremes and when thereupon the Persian threat materialized, the neighbouring Greek *poleis* had to follow suit and build triremes galore (ἐς πλῆθος: Th.I 14.2). However, the silence of our sources does not warrant our pretending that this did not entail grave financial and other difficulties[43], let alone that a *polis* could have taken such a decision in cold blood without such a pressing reason, i.e. out of technical perfectionism. The

---

[43] Even the Athenians had such difficulties: see Arist.*Ath.*XXIII 1 and Plu. *Them.* VI-VII (see p.156 n.68).

trireme quite simply was out of proportion for most archaic, and for that matter even for some later, *poleis*, as the employment of smaller galleys for naval warfare by Peloponnesian *poleis* in the late fifth century proves.

I am convinced that this is why Thukydides left the invention of the trireme out of consideration. The subject-matter of his Archaeology is the genesis of Greek, not Mediterranean, sea-power. He repeatedly stresses this restriction and he leaves out of account what is not strictly Greek. Otherwise he could not have failed 'to include the Ionian fleet <at Lade> among <the greatest sea-powers> of the period before the death of Darius' (Davison 1947: 22[44]). Thukydides' silence on the naval developments in the Persian empire, more generally in the eastern Mediterranean, and for that matter in the Carthaginian sphere, means no more than that he refrained from pronouncing upon developments outside the Greek world. His reason will have been that it was impossible for him to establish the facts (cf.I 22.2-3 and see ch.VII). His silence cannot, in any case, be taken to mean that no important developments took place there. Torr already took Thukydides' restrictive use of 'in Greece' in the sentence 'that it was in Corinth that triremes were first built in Greece' (I 13.2) to mean that he took care 'to save the priority of the Phoenicians'[45]. This no doubt twists Thukydides' meaning, since he may not have been thinking of the Phoenicians at all. Still I consider it likely that he 'cautiously limits his statement to Greece' (*SSAW* 81 n.17), knowing (or suspecting) that the trireme had been introduced into Greece from the outside. In my fifth chapter I shall argue that this was indeed what happened.

To sum up: Thukydides distinguishes three stages in the development of Greek sea-powers. Until far into the eighth century the old—'Trojan'—fashion prevailed: the ships of that period were *ploia makra* and pentekontors, none of them specialized warships; sea-power depended on privately owned ships, primarily those of the kings. The

---

[44] But Thukydides' silence cannot be explained by the lame argument adduced by Davison that it 'may be due to the poor performance of the Ionians or to the fact that he is dealing with the fleets of individual States': the reason must be that Thukydides knew or suspected that this Ionian fleet, in contrast with the navies of the Phokaians and Polykrates, was not Greek in origin but consisted of Persian triremes seized at the beginning of the revolt (see Wallinga 1984: 430 and below p. 133).

[45] Torr 1895: 4 n.8. He adds the interesting, and largely correct, observation that 'Thukydides can hardly mean that the Corinthians were building three-banked ships three centuries before the peace of 404 B.C. The allusion to their three-banked ships is parenthetical'.

second stage took its beginning in the last quarter of the eighth century: Corinth was the first of the new *poleis* to build ships of its own and to introduce some specialization in the fitting-out, and perhaps also in the construction, of these ships. It appears to have possessed a far more numerous navy than other *poleis*, whose naval power continued to depend on few ships of their own and far greater numbers of non-specialized (merchant) galleys. Thukydides implies that the trireme was introduced in *polis* navies during this stage, but he may have dated that event not long before 500. The beginning of the third stage he associates with the death of the Persian king Darius (486): this stage is characterized by the large-scale use of triremes in the Greek world, first by the Sikeliot Greeks and the Korkyraians, and only just before Xerxes' expedition by Aigina and Athens (and others). On this stage I shall come back in the sixth chapter.

In the next I shall analyse the iconographic and other data mentioned in the Introduction against the background of Thukydides' account of the developments and adduce evidence for his view that the last quarter of the eighth century was a vitally important period in Greek naval history, and in particular to ascertain the degree of development reflected in these data.

CHAPTER THREE

SHIPPING IN THE EIGHTH CENTURY BC

1 *Galleys and sailing ships, merchantmen and warships: the earliest iconographical evidence and Homer*

On the basis of the iconographic material of the geometric period collected by R.T.Williams (*GOS* Plates 1–7 and pp.12–42) it can most plausibly be argued that navigation in this period took place chiefly, if not exclusively, in oared ships. As far as I can see there are no early representations of ships for which the use of oars is out of the question and which accordingly should be taken as pure sailing-ships[1]. The first unmistakable picture of such a ship belongs to the *late* archaic period *c.* 515 (Ill.1 = *GOS* Arch. 85). Even the broad-bellied ship of the Aristonothos vase (Ill.2 = *GOS* Arch. 5) is considered a galley by Williams (*GOS* 75). Casson, on the other hand, describes it 'as a merchantman preparing to withstand attack' (*SSAW* fig.80 and p.67) and there certainly is much to be said for this way of looking at it: the ship seems very broad in the beam compared with galleys. Still, one feature of this picture, 'a horizontal line supported on struts' (*GOS* 75), has many parallels in pictures of oared ships (e.g. *GOS* Geom.25, 26, 28, 32; Arch.2 = my Ill.17); at the stem, moreover, are drawn two (or three) projecting timbers such as are often found in undoubted galleys[2]. For these reasons I am inclined to follow Williams' interpretation[3], but this

---

[1] This is essentially Snodgrass' view (1983: 16-17). The criticisms of C.M.Reed (1984: 39-41) are not convincing. His list of representations of 'sail-powered merchant ships' proves less than he claims for it, for such a ship as Homer's εἰκόσορος, though undoubtedly oar-powered, was 'deep-hulled and broad-beamed' as appears from the apposition φορτὶς εὐρείη (*Od.*IX 322-23: see p.41ff.). The Cyprian models (Westerberg 1983: Ill. 50 and 51) certainly cannot decide the issue: not only are their dates too uncertain, but it is far from impossible that oarage is to be assumed for them, as for the others in the catalogue (see p.39 n.22). I would not exclude that Westerberg's 'horizontal, parallel planks' represent the *parexeiresia* (see p.58ff.). Some of these models (Westerberg nrs.23 and 32) appear to be so very small that they can hardly be considered normal seagoing ships. And even if one or two of them were to be considered pure sailing vessels, that still would not be decisive, for they could be ὁλκάδες, i.e. ships dependent on oared auxiliary craft in all but the most favourable circumstances. On the ὁλκάς see p.36.

[2] Cf. *GOS* Geom.2 = my Ill.12; Geom.8c(1); Geom.9 = my Ill.14; Arch. 88; Arch.89

[3] As Van Doorninck has pointed out to me, its 'pronounced rockered keel, its sheer and high sides' are not typical for galleys (as generally conceived). I doubt myself that the strange prow incorporates a ram, but if it does not, the ship still

does not mean that I would deny that the ship is a merchantman.

For the fact is that galleys had great importance in ancient, just as in mediaeval and early modern[4], merchant shipping. The part they played is generally underrated, especially for the early period. The reason is that the interpretations of the iconographic data, as I have already noted, have been dominated by the preconceived notion that the galleys pictured are warships without exception[5].

This view of the early galley is not restricted to the students of the ancient ship pictures but appears to be shared very widely, as I would conclude from the usual interpretation of Herodotos' account (I 163.1-2) of the Phokaians' long voyages to the West. The Phokaians made their long voyages in pentekontors, not round (i.e. sailing) ships. This is usually taken to mean that they travelled in warships[6] and sometimes the inference is then made that they were pirates as well as traders[7], but it is without foundation. In Herodotos' account it is clearly implied that the Phokaian pentekontors had the *function* of the later round ships: they must therefore be considered merchantmen[8]. One may understand Herodotos to mean that the Phokaians, by exploring the seas of the West and by making known winds, currents and other conditions prevailing in those parts, made the routes leading there usable for the sailing-ships of his own day. Before this exploration was accomplished no one could have risked travelling there without oar-power. Even nearer the Greek

---

remains a galley in my view. Basch, who considers the ship to be a pure sailing ship ('évidemment un vaisseau rond': 1987: 233.2), most improbably makes it identical with the ship of a graffito from Utica of the second century A.D. (see his fig. 483).

[4] See e.g. *IHSB* 70 al.; Lane 1973: 122 al.

[5] Gray's very curious classification of the ships of Homeric times in two categories, 'Galeeren' (galleys) and 'Kaïkis' (sailing ships) also seems influenced by this notion (it is so curious because there is no unambiguous evidence for sailing ships in 'Homeric' times). The classification is justly criticised by Humphreys (1977: 347).

[6] See e.g. Stein 1883: 183; How, Wells 1928: I 127; Van Groningen 1946: 81 (a warfleet!); Burn 1960: 144; Austin, Vidal-Naquet 1977: 68; Murray 1980: 105; Cook 1982: 214; Graham 1982: 139; Shefton 1982: 346 (see p.68f.).

[7] This inference in all probability was already made by Pompeius Trogus (Just. XLIII 3.5: *namque Phocaeenses exiguitate ac macie terrae coacti studiosius mare quam terras exercuere: piscando mercandoque, plerumque etiam latrocinio maris ... vitam tolerabant*). I very much doubt (for the reasons discussed by Momigliano 1966: 130f.) that Trogus had independent evidence for what he asserts concerning the Phokaians.

[8] There is no reason to consider them state-owned ships as is done by Austin, Vidal-Naquet (1977: 68) in suggesting that *poleis* like Phokaia 'had a commercial and maritime activity in which large-scale trade was as completely civic in character as for example warfare'. Is this assumption shared by those who stress the Phokaian use of 'warships'? See e.g. Vallet, Villard 1966: 169-70 and Cook 1982: 214. The use of the term pentekontor for the Phokaian merchant-galleys *is* peculiar, but can readily be explained (see p.72f.).

home-ports in the Aegean area the exclusive use of the sail cannot have been an early phenomenon. The prevalence of northerly winds in summer[9], combined with the not very efficient square rig[10], must have made travel under sail difficult except in very favourable circumstances, such as prevailed on the run between Phoenicia and Egypt (see p.2 n. 1) and may have done so elsewhere. But there was another, far more important, cause for the delay of the development of the sailing ship.

This was the great unsafety of the seas, so emphatically stressed by Thukydides (I 4ff.): it was caused by the ubiquity of piracy and the taking of reprisals (σύλη), which compelled all seafarers to be prepared to fight or to flee, and thus practically made the use of pure sailing-ships impossible[11]. Even when piracy was suppressed somewhere, as Thukydides says it was by Corinth in the years before 700 B.C. (I 13.5), the effect must have been so localized that it did not make much difference for the use of ships on long voyages. Reprisals, moreover, surely were even more serious than piracy and far more difficult to suppress, because the *poleis* were involved themselves (see Ormerod 1924: 65). Finally, and most importantly, trade was for long on a small scale and in goods of high price and no great bulk: ships of substantial carrying capacity, as sailing-ships are almost by definition, were not needed. Only with the development of a regular and large-scale Greek import trade in grain, which is taken to have begun towards the end of the seventh century[12], such ships became economically viable, although

---

9 See *Pilot* IV.22 Table I and *The Mediterranean*, Charts of Windroses, p.68-91. See also Murray's important paper on ancient and modern winds (1987).

10 See *SSAW* 274: 'no closer to the wind than seven points'. This is based on late evidence (?: Casson refers to James Smith, *The Voyage and Shipwreck of St.Paul* 1848, 177-78 = ⁴1978, 215; Smith does no more than make an estimate, but he could have had in mind the performance of Lucian's ship (*Nav.*VII), which sailed from Alexandria to the western cape of Cyprus in seven days, presumably with a northwesterly wind). There is no reason to assume that the archaic rig could always do this. I do not share Humphreys' optimistic view that Homeric ships could tack (1977: 351), although I would accept a late sixth century date for the emergence of this technique. Perhaps one may say that the regular use of pure sailing-ships on long passages, such as that from Greece to Italy, which is assumed by Herodotos (I 163.2) presupposes the mastering of this art. The earliest certain mention of tacking known to me is in Poseidonios' account of his voyage from Gades to Rome which is quoted by Strabo (III 2.5 C144): P. here uses the term διαφέρεσθαι which may have been the Greek *terminus technicus* (cf. Philo, *De migr.Abr.*148; NT *Act.*XXVII 27; Plu.*Galb.* XXVI 5; Id. *Mor.*419B = *Def.Orac.*XVII 17).

11 See Ormerod's chapter on piracy in the eastern Mediterranean (1924: 80-107) and Garlan 1989: 173-201. For the notion of σύλη see Ormerod p.59ff. and now Bravo's fundamental monograph *Sulân* (1980); also Garlan p.185-189.

12 See Austin, Vidal-Naquet 1977: 69 and Bravo 1983. The large scale must have been the decisive factor: regular but small-scale transport of grain could easily be

even thereafter the merchant-galley may have been able to compete, especially those of *eikosoros* type (see p.41ff.). Therefore it must have been in the sixth century and on the major grain routes (Sicily to Corinth, Naukratis to the Aegean and the Black Sea to Ionia) that the sailing-ship came into its own.

The rather secondary status of the sail in the early stages of Greek shipping is confirmed in the curious terminology used for the sailing ship. Not only that an equivalent of 'sailing ship' (Du. zeilschip, Fr. voilier, Germ. Segelschiff, etc.) is missing, but the specific terms *holkas* ('towed barge') and *naus strongulê* ('round ship') do not have an even remote connection with the sail. *Holkas* especially is eloquent testimony that the sailing ship started out as a barge for which the pull of towing galleys was the essential propulsive agent. Such barges may well have owed their genesis to special transport problems, like that signalized by Snodgrass (1983:22). Snodgrass argues that the base of the Colossus of the Naxians on Delos, a block of Naxian marble of 5,14 x 3,47 x 0,71m, is 'perhaps an instance where either a specially-built raft or a merchant "round ship" must be inferred in earlier archaic times <i.e. *c.*600)'. Reed's criticism (1984: 40) that here 'Snodgrass contradicts his claim that sail powered roundships appear only in the late sixth century' is too literal-minded: read for 'merchant round ship' 'specially-built *holkas*' and the contradiction vanishes.

There is perhaps one datum suggesting that the building of vessels for exceptional occasions, i.e. for tasks to which the usual galley was less suited, occurred with some frequency at a very early point of time. This is the word *schediê* (σχεδίη) that is used by Homer to describe the craft built by Odysseus to sail home from Ogygia (*Od.*V 163ff.). The term has been very thoroughly analysed by Kurt (1979: 21-24, 78-81), who observes that its semantic development must be old, since it appears to be finished by Homer's times, and like Frisk takes it to mean 'improvised/fast-built vessel' (cf. *SSAW* 217ff.). This translation roughly sums up the range of meaning the word has in later literature from Euripides to Theokritos, being at one end equivalent to boat or ship (Eur.*Hec.*111; Theocr.XVI 41), at the other to swimming-float (Xen. *An.*II 4.28)[13]. A somewhat more restricted range seems to prevail in the

---

realized with merchant galleys, provided they were decked (see p.44f.).

[13] The view that 'classically σχεδία (-η) means "raft"' (Hainsworth on *Od.*V 38), though very generally entertained, has no foundation. The raft may be a very important category in modern systematic treatises on water transport, like Hornell's, but that is not to say that it had any substantive status in the Greek world. Kurt has very properly stressed 'dass im Mittelmeerraum und in den angrenzenden Gebieten das aus Baumstämmen gefertigte Floss ... nie existiert hat' (1979:

Odyssey. As has been established by Casson (*SSAW* 217-219) Odysseus' building technique (*Od*.V 244ff.) is the normal Mediterranean one for ships and the resulting craft is provided with the steering oar that befits a ship or boat (*Od*.V 255 al.). Still the poet suggests that a *schediê*'s seaworthiness is not up to standard (*ib*.174-176). Clearly the *schediê* is seen as of dubious quality when compared with an authentic (seagoing) ship, as is indeed to be expected of a boat built for a special purpose and not in accordance with standard specifications[14]. And this is precisely what must have distinguished the first *holkades* from the galleys too.

Just as all galleys (and Odysseus' *schediê*), the *holkas* will have carried some sail from the start to profit from a favourable wind and to assist the steering, but as in the galley this sail was auxiliary power. There may be regions in the eastern Mediterranean where the meteorological circumstances were so favourable that a *holkas* (and for that matter any galley) could make short voyages entirely under sail (see p.2 n.1), but it will have required prolonged scouting before mariners ventured outside such regions with it. And it may have taken even longer before the *nauklêroi* of sailing ships could find sufficient 'financial' backing to make time-consuming voyages in uncharted waters. That may indeed have been easier in the centralized economies of the Mycenean era.[15].

---

21). 'Never existed' may be a bit too categorical, but in any case there is no record and for the Mediterranean this is understandable: rafts are normally used on canals and navigable rivers, both notoriously rare in the Mediterranean. It is true that Hornell's Group A 'Floats, rafts and kindred craft' (1946: 1-90) includes seagoing types such as catamarans (the Tamil word *kattu-maram* means 'tied logs'), but these craft are far from being simple rafts: they have evolved enough to be considered a separate category and indeed are closely related to sampans and junks (see Hornell, *ib.* p.61ff.). The fact alone that they are built of few logs distinguishes them sharply from Odysseus' twenty-'log' construction.

[14] Although I consider Kurt's rendering of *schediê* defensible, I prefer to think that the aspects just mentioned are more essential than speed of building and inprovisation. At least this is strongly suggested by Plato's use of *schediê* in the *Phaedo* (85C-D), where he makes Simmias argue as follows: 'In fact we ought to achieve one of two things: either to find for ourselves, or learn from some other, the truth about these matters: or else, if that is impossible, to seize upon the best and most irrefutable doctrine that mankind can offer, and take it as a *schediê* on which to accomplish the dangerous voyage of life' (Hackforth's translation, *schediê* excepted). Here the 'best and most irrefutable doctrine' is not something improvised or hurriedly contrived, but it is second best compared with the truth, clearly because of the failing abilities of the philosophers present and the absence of an expert (or an adequate standard).

This conclusion makes the derivation from σχεδόν (for which see Kurt 1979: 79) less and that from Ugaritic *tkt*, itself an Egyptian loan-word, more attractive: see the discussion of the problem by Szemerényi (1986: 444-450).

[15] The construction in Samos under Polykrates of the *samaina*, a special grain-carrying galley, is an indication that by *c*.535 this development had not gone very

Since there is no good reason to expect the early (re-)development of the pure sailing-ship, there is no need to explain its absence in the pictorial record and in the literary evidence as the consequence of a particular angle of vision on the part of the poets and artists, and no reason at all to doubt that the pictorial record is representative of the contemporary state of shipping. Of Gray's alternatives: 'Entweder waren die Künstler an Handelsschiffen <*sic*> nicht interessiert, oder es wurde nur ein Typ für all Zwecke verwendet' (1974: G 62), I choose the latter without hesitation. The fact that as late as *c*.540 Phokaian merchant pentekontors could gain a victory in a great sea-battle—and by ramming tactics! (see pp.68 and 73ff.)—shows the fallacy of the notion that pictures of fighting presuppose the existence of 'warships'. In the early period of Greek history fighting with ships was bound up far more often with piracy and other forms of depredation than with regular naval warfare[16]. For this reason it is impossible to differentiate between the pictures and to identify warships, not even by the ram. It may seem obvious to think that the introduction of this fixture immediately made the ships equipped with it a category apart[17], but as long as the seas were unsafe it is difficult to see how merchantmen could dispense with the ram and other defenses[18]. Did merchantmen of the sixteenth century A.D. dispense with the, surely even costlier, guns? No doubt the ram, which had to be sheathed in bronze (*SSAW* 85), made the ships more expensive, but since no statements of profit and loss for ancient trade have been preserved, it is idle to speculate on the effect of added investments on prices and profits. Maritime trade, as I said, was for long in non-bulk goods, that is goods of relatively high price: the trade of the Phokaians with the West is a good example[19]. Their pentekontors clearly had rams (Hdt.1.166.2), but as clearly were not loss-making.

It deserves to be stressed in this context that Homer's average galleys,

---

far there (see Snodgrass 1983: 16-17 and p.92).

[16] Thukydides' insistence that the sea-battle between the Corinthians and the Korkyraians of *c*.660-640 was the earliest known to him is in itself an indication of the rareness of naval warfare.

[17] Casson for instance thinks that initially there was not much difference between merchant galley and 'man-of-war', but that 'all this had to change when the ram made its debut'(*SSAW* 65), an event he plausibly dates to 'the obscure period after 1000 B.C. that marked the transition from the Bronze to the Iron Age' (*ib.*49). I do not understand Starr's date 'early in the seventh century' (1989: 21-22): eighth-century ship representations clearly show the ram (see *GOS* Geom.2ff. and my Ills.12, 13, 14).

[18] Cf. Beloch's judgement quoted p.17 n.13.

[19] However difficult it may be to identify the wares they handled: see p.70ff.

which as is well known do not appear as fighting ships though they do transport troops (*auteretai!*) and are used in raids, are used for all sorts of work: transport of passengers (Telemachos' party: *Od.*II 413-434al.) and of an ambassador accompanied by a hecatomb (*Il.*I 308-311); the voyages of a king aiming at barter or gift exchange (*Od.*I 180-186) and of a master mariner and *emporoi* on a trading venture (*Od.*VIII 161-164); and, at shorter range, a trip of the owner to outlying possessions (*Od.*IV 634-637) and in 'policing' home waters (*ib.*842-847).

In the later periods—classical and hellenistic—oared vessels still played an important part in Mediterranean merchant shipping, a part which is generally ignored in all but very recent studies: Casson has rightly devoted an illuminating chapter to them[20], though even he underrates their importance[21]. But in the absence of the pure sailing-ship they must have been absolutely predominant in the earlier period. The absence of ships without oars, or without tholes,[22] in the pictorial record and the testimony of Homer who pictures ships as furnished with oars (as does Hesiod in *Op.*628[23]) fully confirm this conclusion.

But if there was 'nur ein Typ für alle Zwecke', that does not mean rigid uniformity. Two-banked ships appear from an early date in the pictures (see p.48ff.) and, to judge from the non-uniform number of rowers (and/or oars), the ships were rather variable in size[24]. In Homer

---

[20] *SSAW* ch.8. Cf.Snodgrass 1980: 137.

[21] His judgement, already quoted, that 'Many more types of merchant galleys are known than of sailing ships, even though *there must have been more of the latter in service at any given time*' (my italics: *SSAW* 158) cannot be true for the archaic period, and in my view is mistaken all along the line. In this respect the Mediterranean must not be measured by a North Sea/Atlantic standard.

[22] More precisely: ships for which tholes or oars are excluded. The fact that obvious galleys are pictured without oars and tholes (e.g. *SSAW* III.73 and my Ills.18 and 23 = *GOS* Arch. 52 and 57) must make us beware of being dogmatic in the case of ships less obviously galleys (as the Cypriote models: see p.33 n.1).

[23] West's preference for the interpretation of the νηὸς πτερά of this verse as sails is not well-considered. It is true that it can be documented in Hesiod's own work, but it is not for nothing that the fragment in question (205) is about the nautical pioneering of a great sailing *polis* (the Aiginetans), a context wholly different from the small-scale shipping work of a Boiotian farmer (who had no time to wait for favourable winds, certainly not in the severely curtailed 'sailing' season Hesiod allows him!). References to 'the usual sense in later poetry' and indeed to most later parallels are anachronistic and that to the North Sea epic Biowulf (218: quoted in the Addenda, p.384) inappropriate. West's note in his translation (Oxford 1988, p.78: 'classical poets use this metaphor of both sails and oars') is more acceptable.

[24] The following list gives the numbers of oars and/or oarsmen/tholes of complete ships represented in the geometric pictures of *GOS*: Geom.9: 14 tholes; Geom.17: 12 oarsmen, ?12 oars; Geom. 19: 39 (meant as 40?) oarsmen; Geom.25a: ?25 tholes, 25b: ?37 tholes (both these pictures, but especially the latter, look rather fantastic); Geom.26: 11 tholes; Geom.28: 5 tholes; Geom.32: 10 tholes; Geom.42: 19 oarsmen.

we meet with at least two classes: in the *Odyssey* (e.g. I 280, II 212) ships commonly have twenty oars and such a ship also figures in the *Iliad* (I 309)[25]. If Humphreys (1978: 165) is right in suggesting that the line 'Come, give me a ship and twenty *hetairoi*' (*Od.*II 212 = IV 669) is a formulaic expression, this would make this sort of ship a well-defined category[26].

On the other hand a ship with fifty oarsmen is launched by the Phaiakians to bring Odysseus home (*Od.*VIII 34ff.) and in the Catalogue of Ships Philoktetes' ships have a complement of fifty oarsmen (*Il.*II 719ff.). In the Catalogue a third type is perhaps mentioned: the Boiotian ships had 120 men on board (II 509f.) and Thukydides seems to regard them all as oarsmen (I 10.4), but it is notable that in his summing up of the development of Greek sea-powers he characterizes those of the Trojan period as consisting of pentekontors and *ploia makra* (I 14.1), and disregards the bigger types[27]. I would explain this inconsistency by assuming that for Thukydides (as for us) Homer's Boiotian ships were an isolated case and that in the remaining traditions, especially those he had collected himself, galleys with more than fifty rowers were not mentioned, just as they are lacking in our other evidence for Homeric, and even later, times. The 39 rowers of Ill.24[28] is the maximum for the period up to *c.*550 B.C. Ships with 120 rowers are entirely lacking in the pictorial record[29].

---

[25] Such ships had a length of at least some 15 metres: the oarsmen, ten to a side, took up some 9 metres (ten *interscalmia* of two cubits: cf. Vitr.I 2.4) to which must be added the lengths of fore-part and stern of the ship. If they were all-purpose galleys and not specialized warships, fore-part and stern will have been of more than minimal length to provide room for cargo and passengers (p.50f. and n.55).

[26] This category is also fairly well represented in the pictorial record, certainly if we assume, as I would, that ships pictured with 10 to 12 oars (or tholes) to a side represent one class of ship (see *GOS* Geom.17, 26, 32; Arch.28). We must reckon not only with artistic freedom (or negligence), but also with some variability around the standard of ten oars to a side.

[27] There is therefore every reason to doubt if Thukydides really believed that the 120 Boiotians all were rowers. His words are 'That they were all ***auteretai*** and fighters he made clear ἐν ταῖς Φιλοκτήτου ναυσί': 'à propos des navires de Philoctète' (de Romilly), or 'in the case of Philoktetes' ships'. This may well be restrictive. In any case I agree with Bremmer (1990: 5-6) in rejecting Casson's argument that the 120 rowers are to be accepted because of Thukydides' trustworthiness as a historian and his naval expertise: Thukydides hardly had independent (non-Homeric) evidence for the 120 rowers.

[28] Ill.16 also shows 19 oarsmen rowing over the *parexeiresia* and moreover has 21 zugian tholes on the gunwale. For *GOS* Geom.19 (= my Ill.24) cf. Williams' discussion *GOS* 28f.: 'It is difficult to choose between the two alternatives—a single-level ship in the Dipylon tradition showing the far-side oarsmen as well as the near-side or an incorrectly painted two-level ship' (see p.63 n.95).

[29] Humphreys suggests that 'biremes with about 100 oars were in use by the middle of the sixth century; they are portrayed on Exekias' meticulously painted

In combination with the early pictorial record, Thukydides' characterization suggests variation in the smaller category (the *ploia makra* of I 14.1) with the fifty-oared galley as an upper limit. In judging both Homer's testimony and the pictures, one must bear in mind Morrison's cautionary remark 'It is possible ... that when the oarsmen are only twenty the ship may be either a small one accommodating only twenty oarsmen or a larger one in which there is plenty of room for cargo in addition to the oarsmen' (*GOS* 46). We must, for that reason, beware of too rigid an interpretation of the variety of the pictures. Nevertheless there are nautical terms indicating differentiation and development, which I shall now consider in detail.

2 *Terms for ships and oarsmen*

2.1 The *eikosoros*

In the Greek literary tradition the oldest term for a specific type of ship is εἰκόσορος. It is employed by Homer in the famous simile where the stake used by Odysseus to blind the Cyclops is likened to the mast 'of a black *eikosoros*, a beamy freighter, which travels over the deep sea'[30].

The basic meaning of the word is not in any doubt: it is an adjective with the sense 'equipped with twenty oars', and cognate with *triakontoros/pentekontoros* (*-eros*), all three compounds of a numeral and a root -or-/-er- (= 'oar': see Kurt 1979: 70ff.). But its meaning as a technical term is disputed. According to Casson 'Homer ... may well have in mind a merchant galley powered by that many rowers' (*SSAW* 169n.5), implying that Homer was thinking of no more than his 'normal' (merchant) galley and this is also suggested by Gray: '... bei Homer sind 20 Ruder das Normale, und das Zunehmen des Laderaumes geht

---

dinos ... <*GOS*>, plate 14c-d <=Arch.53>' (1978: 300 n.10). I cannot understand this judgment. The two ships pictured have 23 and 24 visible oars, i.e. (one presumes) 46 and 48 altogether; one picture shows 21 oarsmen's heads, the other 19; and there are 25 or 26 'ports'. This is not what I would call meticulous painting. The painter, moreover, seems to have been confused as to which bank rowed which class of oar, if his ships must be taken as two-banked ones: he paints the (higher) thranite oars, but what I would call the (lower) zugian oarsmen. This confusion makes me suspect that he tried to picture a type of ship he had not seen, but only heard of, possibly the big galleys used in the Egyptian navy under Amasis, which may well have called at a Saronic Gulf port in connection with Amasis' diplomatic offensive that also led him to subsidize the rebuilding of the sanctuary in Delphi (Hdt.II 180.2 and 182). If this *dinos* may be dated around 530 BC, one could even think of the new trireme, which in my view originated in Egypt around this year (see p.116ff.).

[30] *Od.*IX 322-23: νηὸς ἐεικοσόροιο μελαίνης, φορτίδος εὐρείης ἥτ' ἐκπεράᾳ μέγα λαῖτμα.

Hand in Hand mit der Zunahme der Anzahl von Rudern auf 50 ...' (in the sequel she arbitrarily throws suspicion on the line where *eikosoros* is equated to the 'beamy freighter'[31]). And Kurt (1979: 71) asserts that 'Homer ... den Terminus technicus *eeikosoros* nur an einer einzigen Stelle <gebraucht>, wo es sich zudem um einen Frachter handelt, der weniger Riemen führt als ein Kriegsschiff. Zwanzigriemige Kriegsschiffe <*sic!*> sind ohne Nennung des Fachausdrucks gemeint in A309; α280 δ669, wo stattdessen die Zahl der rudernden Mannschaft angegeben ist'. All three critics appear to take Homer's *eikosoros* for smaller than the *triakontoros* and to make light of the apposition φορτὶς εὐρηίη and of the context of *Od.*IX 322-23. But this context must be taken very seriously: in the words of Hermann Fränkel 'dient alles der Schilderung eines dicken, wuchtigen, langen Mastbaumes: ein Zwanzigruderer, ein breites Lastschiff, für die große Fahrt bestimmt, wird schon einen kräftigen Mast brauchen' (1921: 54). The effect of the simile would indeed be entirely lost if the *eikosoros* were no more than the smallest class of galley to which a specific denomination was applied. What the critics do in fact, is to rob the term of any specific meaning and to assert that *eikosoros* and its cognates signify no more than 'any ship with so many oars(men)'. I consider this extremely unlikely for all three terms and in any case it cannot be true for *eikosoros*. This term is later used in precisely the same sense as in Homer's simile, i.e. for big, even very big, merchantmen: the biggest freighter of all antiquity—Hiero II's *Syrakosia*—is expressly named *eikosoros*[32]. For these

---

[31] 1974: G 115. It really is amazing how the possibility that galleys varied in width is here disregarded and increase in cargo-capacity identified with increase in length. The same disregard has caused Snodgrass to say (concerning the base of the Colossus of the Naxians on Delos): 'given the measurements for oared galleys <erroneously estimated at "about 21.9 m long and 2.1 m in the beam"> I can see no way that it could have been safely carried on one of these; so here is perhaps an instance where either a specially-built raft or a merchant "round ship" must be inferred' (1983: 22; on Snodgrass' measurements see below, p.53 and n.63). An *eikosoros* of the same length as an Homeric galley could easily have carried the block of 5.14 x 3.47 x 0.71m, as far as space is concerned at any rate. But in view of the loading problems a raft is more probable.

[32] Ath.V 207c: on this ship see Casson *SSAW* 185ff.(Appendix to ch.9, pt.2 and 4) and, for a convincing (*and* disconcerting) alternative calculation of its size, Duncan-Jones 1977: 331-32. The other instances are [Dem.] XXXV 18 (an *eikosoros* with a capacity of 3000 κεράμια, i.e. between 200 and 300 m^3: cf.p.25 n.33); Nicostr.Com. fr.9.1 (K/A); Mel. *EG* 4351 = *AP* V 203.10 (a former mistress, in her prime like a κέλης, now going grey and bulging out like an *eikosoros*; Theodorid. *EG* 3107 = *AP* VI 222 (cattle-carrying *eikosoros*); Teles p.27H (the ἀκάτιον where you have been born is better than the *eikosoros* where you are an exile). There is no reason whatever to make these ships pure sailing-ships, as Casson does (*SSAW* 169 n.5). Of course the oars of the later instances were multiple-rower sweeps.

reasons I conclude that the *eikosoros* was precisely what Gray denies it was: 'ein rundes Handelsschiff ... mit Segel und einer schwachen Besetzung von 20 Rudern und ... fähig größere Lasten zu befördern' (1974: G115-16). This description I take to be correct for all *eikosoroi* of however different size they may have been, just as the modern term 'full-rigged ship' was used for ships of widely divergent sizes.

The term *eikosoros*, in other words, is an invaluable indication of the development and differentiation of shipping in the times of Homer. The type represents an important, and necessary, stage in the development towards the pure sailing-ship, but clearly was so useful that it could maintain itself at least to the third century B.C.[33]. I would imagine that 'the oars served as an auxiliary motor serves on a sailing ship; with oars the vessel could maneuver better when entering or leaving harbor, could make some headway even in a calm and, when beating to windward was not entirely dependent on tacking'. That is to say that the *eikosoros* was of the same category as the mediaeval merchant trireme (see Lane 1973: 122).

No precise information has been preserved concerning the early *eikosoros*, but Homer's characterization makes certain that it was broader in the beam than the average galley of the time, and that this widening was effected to increase the cargo-space. It is natural to connect this development with the increasing trade of the eighth century, more particularly with the trade of Corinth and its colonies (see p.27f.). I would imagine that practically from the beginning of its colonizing activity Corinth imported some corn[34], there being little else the colonists could give in exchange for the oil, wine and manufactures they imported. On this assumption a demand for bigger ships at an early moment would be very likely. This moment will have been so early that there could be no question of using a pure sailing-ship. I have already referred to the reputation of the Phokaians as the prospectors of

[33] I have no doubt that the most important factor in the preservation of its oar-power was the failing manoeuvrability of heavy-loaded freighters. For the same reason sailing-ships were often accompanied by small galleys, *lemboi* and *akatoi* for instance (see *SSAW* 248-9 and n.93-97).

[34] See Bravo 1983: Bravo no doubt rightly stresses the indications in Homer and Hesiod for occasional trade in grain, but a ship like the *eikosoros* presupposes the regularity of that trade. I would associate this regular trade with the early stages of Corinthian and Megarian colonization in Sicily, when the first settlers must have been absolutely dependent on the mother cities not only for luxury wares, but also for wine and oil (Wallinga 1965: 17f.). Bravo's carefully argued thesis—that there was a fairly regular, but variably located, demand for grain in Greece—is misrepresented by Reed (1984: 35 n.32) who perversely considers it 'partly refuted' by Jameson (1983: 8, 12-13). Jameson's remarks on the reasons why famine was exceptional in Greece on the contrary reinforce Bravo's argument.

the routes to the West (see p.34). It is assumed very generally that the beginning of their activities must be dated to the second half of the seventh century[35]. Until that time, at the very least, the use of sailing-ships in the commerce with the West seems unlikely.

Widening of the ship will not have been the only change caused by the new trade developments. The Homeric galley is plausibly considered to have been undecked or, rather, fitted with half-decks fore and aft[36]: the hold accordingly was open. When in the eighth century trade began to increase and perishable goods like grain began to be regularly[37] shipped over long distances, it became necessary to cover the hold of the ship, that is to fit it with a deck. Moreover, the closed cargo-hold that came into being in this way had to be accessible so that the deck had to be fitted with openings, that is to say hatch-ways[38]. Both these additions affected the rowing system, because in the original (Homeric) galley the oarsmen had sat on, with their legs down under, the beams (the ζύγα[39]) on which the deck now had to be fastened. Also the hatchways presumably were made in the middle section of the deck (as in modern ships), which is precisely where the oarsmen had been seated. It may for that reason be assumed that their seats were moved away from the middle of the ship, which would be possible only if there was sufficient room between the hatch-coamings and the gunwale to give the oarsmen adequate purchase. In the *eikosoros* the widening of the ship will have been adapted to give this room. Since, moreover, the ship's hold, down which the rowers had held their legs, was now closed, the rower's seat had not only to move away from amidships, but had to be raised. This must have been done by placing him on a bench, probably named θρᾶνος[40]. At the same time his thole, i.e.

---

[35] Dunbabin 1948: 242; Jeffery 1976: 227; Boardman 1980: 214. I am very sceptical about this date, which may have to be considerably lowered: see p.75.

[36] See *GOS* 47ff.; *SSAW* 51 n.58; Gray 1974: G99 and Abb.29; Kurt 1979: 128-32.

[37] It is not improbable that open galleys were employed for the occasional trade in, and short-distance transport of, grain and other *biotos* alluded to by Homer and Hesiod (*Od.*XV 403-84; XVII 248-50; *Op.*618-94: cf.Bravo 1983: 17f.), but regular trade over distances like that between Corinth and Syracuse required a better means.

[38] Evidence for hatchways in ancient ships is very rare. Casson (*SSAW* 177 n.47) shows how rare. But they must have been there, as in the grain-carrying *samaina*, which had an all-over deck (Hsch. *s.v.* Σαμιακὸς τρόπος: αἱ λεγόμεναι Σάμαιναι ναῦς κατέστρωντο δι'ὅλου). The first sailing-ship in the pictorial record (see Ill.1) has a hatch which is battened down and covered over with canvas held down with a network of cordage (better seen in the drawing reproduced in Köster 1923: Pl.43 opposite p.156). The crossed pattern of the cordage must not be mistaken for screening along the side of the ship to keep out water: such screening would be fitted to the ship's gunwale and to judge from the position of the helmsman it is not.

[39] See *GOS* 51; *SSAW* 46 n.19, 220; Gray 1974: G98; Kurt 1979: 122f.

[40] Such a θρᾶνος must have given its name to the θρανίτης, the uppermost of the

the gunwale of the ship, had to be raised as well. These four innovations: widening of the beam, hatchway, raised gunwale, (raised) rowing bench I have combined in one cross-section, juxtaposed to one of the 'Homeric' galley (Ill.3). I must emphasize that this 'reconstruction' is only a possibility, but I am certain that something like it must actually have come into being[41].

The *eikosoros* evidently had made its appearance by Homer's times, that is to say that its invention could be more or less contemporaneous with the appearance of pictures of the two-level ship. This epoch appears therefore to be of crucial importance for the development of Greek shipping, and no wonder. As already explained, the period after the foundation of the first agricultural colonies in the West must have witnessed the steady increase of long-distance trade on the routes of the West. Particularly the planting of colonies on the Strait of Messina and the foundation of Syracuse must have intensified the trade between Greece, above all Corinth, and the West. Syracuse may well have been the first exporter of grain on a large scale and the demand for larger ships will first have arisen in these parts. It may therefore not be entirely by coincidence that the earliest picture of this sort of ship we possess is supposed to have originated in the West: this is the picture on the Aristonothos vase, mentioned earlier (Ill.2). I already noted the lack of agreement concerning the character of the ship, whether it was a merchantman or a warship. The cause of this disagreement is now revealed: if the ship is an *eikosoros*, i.e. a transitional form between galley and sailing-ship, both views have some foundation. Of course there can be no certainty about this identification: the most one can say is that the picture fits in very well with my interpretation of the Homeric evidence for ship development (see p.63 n.96).

2.2 The *pentekontoros*[42]

Compared with *eikosoros* the term πεντηκόντορος is late. It occurs for the first time[43] in Pindar (*P.*IV 245) and then in Herodotos (I 152 al.) and

rowers in the Athenian trireme: see *SSAW* 83 and n.33 (Casson derives the word from θρῆνυς 'stool': cf. Frisk s.v., who thinks that both words are cognate with the verb θρήσασθαι 'sich aufstützen, aufstemmen' (to lean on).

[41] For an alternative, and probably more realistic, reconstruction see p.56 and Ill.8.

[42] For a valuable and well-documented study of the pentekontor see Bremmer 1990. I shall leave the *triakontoros* out of consideration: too little is known about this type, especially for the archaic period. Hammond's assertion that the new warships of Corinth under the Bacchiadai were 'triaconters' and 'penteconters' (1982: 335) is without any foundation where the former are concerned.

[43] It *may* have been used by Archilochos in the poem (192 West) he devoted to

Thukydides (I 14.1, 3; VI 43, 103.2). It is on the authority of Thukydides that it is applied to galleys of the geometric and archaic ages, especially to those of the Catalogue of Ships: according to Thukydides the *nautika* of the 'Trojan' age, and even in the archaic period, chiefly consisted of pentekontors and long ships.

Until recently, the meaning of *pentekontoros* has never been in doubt. The term has traditionally been taken to refer to a *monokrotos* galley with 25 oars to a side, for instance by Köster (1923: 97). But now, in the light of the fact that so many early Greek ship representations depict ships with two banks of oars, the meaning of the term has been reconsidered. Casson for instance is inclined to think that the archaic pentekontor normally was a two-level ship, although he also recognizes a single-banked type (*SSAW* 54-55, 56, 58-59 al.). Gray, who is well aware that we have no direct evidence for the significance of *pentekontoros*, enumerates four possibilities: 1. single-banked ships with 25 oarsmen a side; 2. double-banked ships with 25 oarsmen a side, 12 and 13 in each bank; 3. both these variants at the same time, that is to say that the term *pentekontoros* stood for any ship with fifty oars; 4. double-banked ships with 25 oarsmen to a bank, 50 to a side (1974: G73/74). This really is a fantastic statement, not only the last item in it (which of course cannot survive Gray's own obvious objection that such an arrangement would require a term like *hekatontoros*[44]). Just as in the case of *eikosoros* (see p.42) the term is assumed to have no technical meaning at all and to be simply the equivalent of 'manned by 50 rowers' and for that reason applicable to different types of ships at once. This notion seems utterly improbable to me and runs counter to the way Herodotos and Thukydides use the term: in Herodotos' description of Xerxes' armada the list τριηκόντεροι δὲ καὶ πεντηκόντεροι καὶ κέρκουροι καὶ ἱππαγωγὰ πλοῖα (VII 97) suggests that separate and precisely defined categories are meant; and when Thukydides distinguishes pentekontors from *ploia makra* (I 14.1) the former clearly are the

---

the miraculous rescue by a dolphin of a certain Koiranos, one of a party of fifty Milesians (πρέσβεις in Demeas' paraphrase: *FGH* 502F1) who were shipwrecked off Naxos, but it is also possible that the number of the envoys inspired later tellers of the story to foist in the term pentekontor. *Pace* Bremmer (1990: 4) it hardly seems credible that the fifty envoys sat at the oars themselves (see p.57 n.81). And this applies even more to the 50 daughters of Danaos, who according to the *Marmor Parium* travelled from Egypt to Greece in the first fifty-oared galley built by their father (*FGH* 239F9; see Bremmer *ib.*, p.6).

44 The terms ἑκατόντορος (Poll.I 82) and τεσσαρακόντορος (Sch.Ael.*Tact.* p.234 K.-R.) seem to be scholar's words: the former is not, therefore, 'the invention of a modern editor' (*GOS* 195), but that is not enough credit to save Blass' conjecture in Bacch.XVI 87.

uniform category, the second a rag-bag. Of course I do not want to exclude the possibility that there were fifty-oared ships of different types, as Gray assumes, arbitrary as the assumption seems to me. What I hold to be most improbable is that the same term was used for several different types at the same time. To my mind there was only one authentic 'pentekontor' for Herodotos and Thukydides and this is confirmed by other evidence.

When all the passages where the term *pentekontoros* occurs are surveyed, one thing is very striking: with one exception all the pentekontors mentioned in the historical tradition appear to be in the management of states (or tyrants), and are, therefore, presumably state property[45]. This finding may give the clue concerning the meaning of the term pentekontor, for there is reason to think that state-owned ships were less heterogeneous than privately owned ones.

Privately owned galleys certainly were very heterogeneous. We know several types of these ships, summed up in *SSAW* (ch.8), and what is very striking about them is the diversity within each type[46]. This diversity has its counterpart in the ship-representations: here too the number of oars is varied (see p.39 n.24). But in the Greek navies of the fifth and fourth centuries no such diversity was found. There is in particular no evidence that there were triremes of different size (length), something we should expect, especially if the trireme was a Greek invention. The trireme as we know the type[47] may be considered the development of a *monokrotos* galley of some 50 oars[48]. But if *monokrotos* and *dikrotos* galleys of fifty oars coexisted in the earlier

---

[45] The states (tyrants) in question are: Sparta (Hdt.I 152.2); Polykrates of Samos (Hdt.III 39.3, 41.2, 124.2); Thera (Hdt. IV 153, 156.2); Persia (Hdt.VII 36.1-2, 97, 184.3); Gelon of Syracuse (Hdt.VII 163.2); several Greek *poleis* (Hdt.VIII 1.2, 2.1, 46.4, 48); Rhodos (Th.VI 43); Etruscan cities (*Tursênia*: Th.VI 103.2); Trapezus (Xen. *An*.V 1.15; VI 6.5, 22, 23); Taras, Lokroi and Elea (Plb.I 20.14); Carthage (Plb.I 73); the kingdom of Pontos (Memnon *FGH* 434F27.2). I leave aside mythical pentekontors (as in Eur.*IT* 1124) and p.'s introduced in comparisons (as Str.II 3.4 C99). The Phokaian p.'s (Hdt.I 163.2, 164.3) are the only clear case of pentekontors used as merchant ships in private hands.

[46] There are *akatoi/actuari(ol)ae* of 50 (Luc.*VH* I 5), 30 (Liv. XXXVIII 38.8) and 20 oars (Cic.*Att*.XVI 8.6); *kelêtes* of 10 (Ephippos fr.5.17 K/A) and 4 oars (Synesios *Ep*.IV 165); *lemboi* of 50 (Plb.II 3.1) and 16 oars (Liv.XXXIV 35.5); *kerkouroi, kybaiai* and *phasêloi* also come in different sizes, but no oars are mentioned (*SSAW* 163ff.).

[47] It is necessary here to emphasize that our specific information comes exclusively from Athens.

[48] Since there were 54 zugian oars in a trireme, and the zugian oars must be considered the descendants of the oars of the *monokrotos* ancestor of the trireme, one must not be dogmatic about the original number, but it seems reasonable to assume that extension of the number from 50 to 54 became possible when the superstructure of the trireme, including the *katastrôma*, was perfected (*GOS* 284; *SSAW* 87).

navies, we ought to have triremes of different length too, that is to say at least a type with some 72 oars and the type we find in our sources with its 170 oars. The absence of any trace of *trikrotos* galleys of different specification, at least in the pre-Hellenistic period[49], goes against the assumption of different classes of pentekontor, as does the absence of any qualification of the term in our sources (we should expect long and short pentekontors). Again, this is not to say that we must absolutely deny the simultaneous existence of *monokrotos* and *dikrotos* galleys of 50 oars, but only that we must reserve the term *pentekontoros* for one of the types only.

Because the trireme appears to have been developed on the basis of the *monokrotos* galley of 50 oars, it would be logical to assume that the pentekontor was of this type. But, as remarked already, this is not the opinion of Casson[50] and there are very good reasons for his view. Casson himself stresses the better qualities of the smaller *dikrotos* ship: it was faster, stronger and more shock-resistant than its single-banked sister and 'offered a good deal less of a target to an enemy ram' (*SSAW* 56). Such qualities could indeed have convinced a naval board when it had to choose between *monokrotos* and *dikrotos* types of fifty oars. But the question really is whether such a choice is likely to have presented itself during the second half of the eighth century, the time of the earliest representations of the *dikrotos* oarage (see Ills. 9, 12, 14). In the face of the fact that Homer's testimony makes the normal working galley of the eighth century a ship powered by twenty oars, i.e. a ship of some 20 metres long, and that this particular length is rather normal for early ships in other cultures[51], a *monokrotos* galley of 50 oars and a length of some 35 metres (cf.*SSAW* 56) is not something to be surmised gratuitously for so early an epoch. Certainly such a ship would have been superior to the Homeric galley in some respects. It was perhaps somewhat faster and had a far greater carrying capacity, in particular for passengers and soldiers, but one may well question the usefulness of such qualities at the end of the eighth century. At that time there were,

---

[49] The Rhodian *triemiolia* in my view was a smaller type of *trikrotos* ship: see *SSAW* 129ff. I very much agree with Casson's explanation of its genesis.

[50] *SSAW* 59: ' ... when Herodotos and Thukydides assume the penteconter to have been the standard ship of the line until the arrival of the trireme, they surely have the two-banked version in mind' (in note 82 this judgement is convincingly substantiated, but the effect needlessly weakened because Casson drags in the *monokrotos* 'pentekontor' again).

[51] The excavated Viking ships have this length on the average: the Tune ship 19,5m, the Gokstad ship 22,8m and the Oseberg ship 21,5m (Brøndsted 1965: 140, 141, 145); so has the mediaeval Utrecht ship (see Vlek 1987: Illustr.5.1.1). See p.50 and n.55.

one imagines, no Greek states needing specialized troop transports, nor will big passenger transports have been in demand[52]. And for the beginning long-distance trade in perishable goods (chiefly grain) a 'glorified racing eight' (see Tarn 1933: 59), which the fifty-oared *monokrotos* galley must have been even more than the trireme, was not needed. For this task, as we have seen, the *eikosoros* had been developed. Add to this that it was a less handy ship, that it offered a good deal more of a target to the ram, and needed more room in naval yards, and the surmise that the pentekontor was such a *monokrotos* ship will appear less than probable. Of course the trireme presupposes a predecessor of this sort, but as the trireme is a development of the late sixth century (see ch.V) there is no need to date that predecessor two centuries earlier.

Recently an interesting, and to me practically decisive, argument in support of the thesis that the pentekontor was not of the long *monokrotos* type has been proposed by Snodgrass (1983: 16ff.). His case is based on the find in the Samian Heraion of a stereobate which he describes as 'a row of nine parallel oblong stone blocks with the shortest ones at the ends and the longest ones in the middle; these blocks served as supports for a complete ship that was dedicated around 600 BC'. The blocks (better: slabs) make up an oval foundation, truncated at both ends, defined by a length of 23.33 m. and a width of 3.22 m. (Ill. 4, cf. Walter, Vierneisel 1959: Abb.1), that is to say roughly the dimensions of the ship placed on it[53]. Snodgrass suggests that these dimensions fit the pentekontor and in my own view they are ideal. With two banks of 13 and 12, or more probably 14 and 11[54], oars a side the oarage of the pentekontor took up 11.7 m or 12.6 m of its length (13 or 14 *interscalmia* of 0.9 m (see p.40 n.25). What part this was of the total length is a matter of

---

52 Fairly regular movement of large numbers of men will have followed the establishment of the 'foreign legion' in Egypt under Psammetichos, i.e. from the middle of the seventh century (Hdt.II 152ff. and see p.85). But the soldiers concerned will have been of the *auteretês* type (p.79 and n.40).

53 As to the ratio between the measurements of the stereobate and those of the ship, one would expect that in such a situation fore-part and stern of the ship would hang over the supporting construction, but the one-sided tapering of the oval seems to be against this idea.

54 In the Athenian trireme the thranite oars, which were rowed over the *parexeiresia*, numbered 31 a side against 27 zugian and thalamian ones. In my view (see p.53ff.) these two categories go back to the pentekontor (the thalamian oarsmen being the last category to be added) and in this type too the thranites will have outnumbered the zugians, by how many is of course uncertain: a ratio of 15 to 10 is an outside possibility, 14 to 11 the most probable in my view (see Ill.76). The inverse ratio (12:13, 11:14, let alone 10:15) seems an impossibility to me (cf. Gray 1974: G 73). Note that the galley of Ill.14 has 14 (15?) tholes on the *parexeiresia* and has room for 10 or 11 on the gunwale, the sheer curtailing the horizontal part of the latter(cf. the frontispiece).

conjecture (and it may well have varied), but to judge from the more careful representations of archaic galleys[55] I would estimate it at something like a half: the total length of the type would therefore amount to between 21 and 25 metres, which is perfectly commensurate with the dimensions of the stereobate. On this reasoning the twenty-oared Homeric galley would have been somewhat shorter (18-22m).

The width of this ensemble is also what one must expect. As I shall argue presently (p.53ff.), the *parexeiresia* and the thranite bank of oars belonging to it had been invented and mounted on merchant galleys by the middle of the eighth century. Then the situation arose in the last quarter of the same century (see p.19f.) that the public authorities of the new *poleis* obtained the resources to improve the ships they used to fight pirates and to ward off raiding neighbours by raising the number of oarsmen. The obvious means to realize this improvement was the mounting of the new device on galleys that retained their original, zugian, bank of oars, or (better) the reintroduction of this original bank in a *monokrotos* galley with *parexeiresia* (see p.56ff.). In this way there was no need to build bigger (longer) ships (and naval yards to match them). If *polis* authorities now decided to build some ships for their own exclusive use, they could do so in the certainty that they would be able to reduce the cost of maintenance of their new navy by selling the older ships to private shipowners who used the same type (see p.26ff.). For their new ships remained in the old class of 'Homeric' galleys, though the *poleis* will have preferred the biggest species within this class: hence pentekontors, not tessarakontors.

Such *dikrotos* galleys will not have been much narrower than the trireme, for, as can be seen in the drawing of Morrison's reconstruction (Ill.5 = *GOS* Pl.25[56]), the addition of the third (thalamian) oarsman need

---

[55] *GOS* Arch.52, 57 (= my Ills.18 and 23); *SSAW* Ill.73, 79, 90. Van Doorninck has objected that this estimate is based on a choice of representations that is 'blatantly selective' and that it assumes an 'unbelievable, and unparalleled, waste of space and rowing power on a warship'. Selective my choice certainly is, and deliberately so, for I do not believe that the pictures, the vase paintings in particular, must be taken indiscriminately as technically correct drawings, as is often done: the painters will have exaggerated certain properties of the ships, for instance to give the impression of speed, as in *GOS* Geom. 42 and Arch.2 (= my Ills. 16 and 17). But the decisive point is that there is no reason whatever to believe that ships of the archaic age were built to strict 'warship' specification, not even the galleys that were built for the *poleis*, which had other tasks than fighting at sea and, if I am right in that hypothesis (see p.26ff.), were sold to private shipowners to be employed as merchant galleys.

[56] I much prefer this schematic cross-section to the more sophisticated one in Morrison, Coates (1986: fig.57), not only because the latter is based on the full Athenian evidence—relatively late evidence that is—but also because it is based on

have made no difference for the width of the ship. This width may be estimated at *c.*3.25 m for the hull[57] (and 1.2 m more for the *parexeiresia*) at the lowest, that is to say that the hull could have had exactly the width of the middle stone slab of the Samian stereobate. This similarity is significant, in particular because there is no reason to assume that the width of a *monokrotos* galley with *parexeiresia* would be comparable: the hull of such a ship could have been as narrow as 1.7 m[58]. The Samian ship will have been secured on its basis by more or less vertical props.

For these reasons it is a most attractive and plausible hypothesis that the dedicated ship was a pentekontor, as Snodgrass suggests (see for a possible reconstruction Ill.7b). Also it would be in conformity with what appears to be the high status of the dedication. Its conspicuous position in the *temenos* and the fact that the whole ship was dedicated make it almost certainly an affair of the state[59], irrespective of whether it was a *Beuteschiff*[60] or a Samian naval vessel of exceptional renown[61] that was

---

radical speculation concerning the details of the construction (this speculation may well be on the right lines, but it must not be projected back into the archaic period).

[57] 2 x 1.5 m for the looms of the zugian oars and *c.* 0.25 m (at a guess) as elbow-room for the zugian oarsmen. In the trireme the width may have been somewhat greater, as Morrison reasonably assumes (3.87 m : *GOS* 285) and cf. the new reconstruction (1986: Ill.57) which is even wider (*c.* 4.20 m).

[58] The looms of the (thranite) oarsmen took up less than 0.75 m each within the gunwale.

[59] Cf. the dedications of three 'Phoenician' (i.e. Levant-built) triremes after the battle of Salamis (Hdt.VIII 121.1).

[60] So Walter 1976: 58. Walter's mention of Kolaios (Hdt.IV 152) in this connection is singularly inappropriate: Kolaios and his shipmates dedicated a bronze *krater*, not a ship. Walter's view, which goes back to Buschor (*AA* 1935: 238f.), is shared by Shefton (1982: 344). The same unfortunate suggestion is made by Shipley 1987: 57.

[61] I am sorely tempted to think of one of those four ships Ameinokles built for the Samians (Th.I 13.3). If these constituted the first navy of the Samian *polis* and were the cause of its reputation as a naval power, the motive for the dedication might be sought in the wish to consecrate one of these celebrities. And this again would explain why the memory of Ameinokles' activity on Samos was so vivid and precise as to the date (see p.13 at n.3). An effective life of a century may be much to surmise, but at least one very durable ship is on record: Demetrios Poliorketes' *hekkaidekeres*, built in 288, brought Aemilius Paullus to Rome in 167 (Liv. XLV 35.3, cf.*SSAW* 139 n.12). An even much older ship is on record in the *ploion*/triakontor that was used in Athens as a *theôris* (see p.18 at n.17) and its reputation, however unfounded it may have been, proof that such durability was taken as credible. Pride of the Samians in their first pentekontor could well have led to very fastidious maintenance.

When this book was already in type, I learnt that Walter has published a plan of the Heraion for the years around 650 BC, which features *two* ship stereobates: the one described above, and another south of it, which is similar but somewhat wider (1990: Abb. 92, p. 83). When and by whom this second stereobate was found, is left in the dark: it is not alluded to in Walter 1976. Is it conceivable that there were

dedicated: in neither case a less prestigious type could have been taken into consideration. This much reinforces Snodgrass' suggestion. But however attractive and plausible this hypothesis may be in the perspective of my general argument: as a clear-cut, scale 1 : 1, measurement of an ancient galley the stereobate remains an isolated datum, and must remain so as long as no galley wrecks have been found by underwater archaeologists. For this reason the hypothesis needs further confirmation, as is indeed available, though in less concrete form. The evidence in question—provided by the text of the truce of 423 between the leagues of Sparta and Athens (Th.IV 118.5; see p.25)—consists in the clause prohibiting the Peloponnesians to use 'a long ship or any oared vessel with a capacity of more than 500 measures', which attests the viability of ships of upwards of 50 m^3 capacity—i.e. far smaller than triremes with their holds of about three times that capacity (*c.*27 x 3,5-4 x 1,5m)—as naval units at the time. As I noted, the *poleis* still using such ships in 423 no doubt were backward and had not developed further than Thukydides' Trojan-style pentekontors and *ploia makra*. In other words, the clause at issue very strongly suggests that both the latter categories remained within the limit the truce prescribed.

With this pentekontor a ship came into being that was ideally suited to the needs of the *polis*. It was much faster than its ('Homeric') 'twenty'-oared *monokrotos* predecessor; it was also more handy, more manoeuvrable and far more versatile. This was so because it could be rowed by one or both banks of oars, just as later triremes were used as troop transports, and also were converted into horse transports, and then were rowed on the *monokrotos* system (see Ill.3 and p.171). The number of oarsmen could therefore be adapted to the purpose of the voyage: if speed was not the first requirement, rowers could make place for passengers or troops (or cargo), but if it was, or if time was short, the two banks could both be manned. Such different situations are illustrated by the pictures: in Ill.9 both banks are manned; in Ill.15 only the zugian bank is manned while in Ills. 14 and 16 only the thranite bank is manned (in Ill.16 the zugian tholes are clearly visible and vacant).

This versatility must have made the pentekontor particularly suited to naval requirements: for the authorities in charge of the suppression of piracy its *dikrotos* oarage was an essential improvement, if only because the pirates themselves not improbably used the system[62]. Rowed on the

---

four ships dedicated and that together they were known as 'Ameinokles' ships'?

[62] For a pirate *dikrotos* see *AP* VII 640.4: ληιστέων ταχινὴ δίκροτος ἐσσυμένη. Typical pirate *dikrotoi* were the ἡμιόλιαι: cf. Theophr.*Char.*XXV 2; Arr.*An.*III 2.4 and Hsch.*s.v.* I suspect that the Illyrian (pirate) *lemboi* of fifty oars were all *dikrotoi*: the

monokrotos system it was especially serviceable for the transportation of official delegations, embassies and passengers[63]. As soon as the system was in existence, it will therefore have been adopted for the ships of the *polis*.

As I suggested earlier (p.22f. and 32), the decision of *polis* authorities to build such ships will have led to some specialization[64] consisting in what Thukydides sums up in the term κατάφαρκτος (I 10.4), i.e. 'providing protection for the rowers on the ship's sides against sun, cold, or rain, not to forget missiles'[65]. In the later Athenian navy such protection consisted in the form of screens, which were no doubt fastened outside the extensive superstructure of the trireme[66]. Their equivalents in the pentekontors must have required a supporting construction, which may have made the ship awkward to use as a freighter[67]. This fixture might therefore have made the pentekontors provided with them—but only those—a category apart and to a high degree analogous, functionally in any case, to the later triremes. But I do not believe that it was this that led to the use of the specific term *pentekontoros*, but rather the standardization that was introduced by the *polis* authorities.

2.3 *Zugios, thranites, thalamios, parexeiresia*: the genesis of the *dikrotos* oarage

Concerning the genesis of the *dikrotos* oarage the best-known hypothesis is perhaps that of Lionel Casson[68], which can be put into words as follows: originally the *monokrotos* galley (Ill.3a) was propelled by one

---

fact that the type is explicitly specified as two-level only once (Liv.XXIV 40.2: *lembis biremibus*) need not mean that there was another, as is suggested by Casson (*SSAW* 125-6). It is significant that *liburnides* became the generic name of light swift *dikrota* (App.*Ill.* I 3; cf. Lucan III 534 and Luc. *Am.*VI).

63 For passenger *dikrotoi* see Cic.*Att.*V 11.4, XVI 4.4; Hor.*Carm.* III 29.62.

64 Although the pentekontor did not itself become specialized in the sense of 'usable for naval tasks only': see ch.IV.1 on the Phokaian pentekontors.

65 Gomme *HCT* I.113. referring to Köster 1923:116. Gomme's comment that Köster's interpretation is misleading and that *katapharktos* 'should mean "decked", i.e. able to carry passengers (the fighting forces) as well as the rowers', is erroneous and starts from the meaning of *kataphraktos* as it became in hellenistic times (see *SSAW* 123 and n.94).

66 See *GOS* 302, *SSAW* 88 and 249. Polyainos (III 11.13) absurdly makes the fastening of the screens that must have been standard navy routine into a clever trick of Chabrias.

67 But not to such a degree that the ship could not be converted at modest expense.

68 *SSAW* 53ff. Casson's argument strongly resembles that of Köster 1923: 100f. Köster curiously thought that this arrangement was soon abandoned: 'Der beschrittene Weg, die Anzahl der Rojer zu vergrößern, ohne gleichzeitig das Fahrzeug zu verlängern, war nicht der rechte, man hat ihn bald verlassen'(101).

bank of oarsmen, who rowed from benches on a level with, and had their tholes on, the gunwale; then on some ships a fighting-deck was installed, which could be used to support additional rowing benches, so that the ship could be rowed from either bench, the choice depending on the circumstances: in a fight, when the deck had to be kept clear, from below; otherwise from above 'where, in any kind of sea, oarsmen no doubt stayed a good deal drier' (*SSAW* 55). At a certain moment the step was taken to work the oars from both levels at once and the *dikrotos* oarage was born[69].

This hypothesis is chiefly based on a number of pictures[70]. The interpretations involved are perhaps possible, although the influence of the fighting-deck is a mere assumption and not well considered. For one thing the rowers of a *monokrotos* galley must have been seated near the middle of the ship: for this reason the fighting-deck, which is plausibly assumed not to have taken up the full width of the ship[71] must have been above the heads of the original rowers. As a consequence rowing from this fighting-deck necessitated the use of (much) longer oars with the proportions of their inboard and outboard parts changed (Ill.6). The use of oars of different length may be possible, as has been argued by R.C.Anderson and assumed by many others, but there is no certain trace of it in the ancient evidence—nor anywhere else—and it should not be taken as certain on grounds of probability alone[72]. Formerly, the seeming plausibility of some reconstructions of the trireme, which assumed oars of different lengths, gave a certain credibility to that assumption. Morrison's reconstruction, however, should have put an end to all that: its oars are of equal length for the three banks[73], and that arrangement has now proved its viability .

There is, however, an even more serious objection to the fighting-deck theory. It is assumed in this theory that the *trikrotos* oarage, such as was used in the trireme, originated in the addition of the thranite bank

---

[69] The authors of *GOS* do not, as far as I am aware, commit themselves to the fighting-deck and are not explicit about the genesis of the *dikrotos* oarage. Recently Morrison has come forward with an alternative (in my view unacceptable) theory which does without the fighting-deck (1986: 33ff.).

[70] *SSAW* Ills.30, 65-6 = *GOS* Geom.28, 25-6. Pictures interpreted by Casson as showing 'oars ... worked from deck level' are *SSAW* Figs. 72,74 = *GOS* Geom.9 (= my Ill.14) and Geom.19 (= my Ill.24). In my opinion both pictures must be explained in a different way.

[71] See *SSAW* 51, cf.Th.I 14.3.

[72] See Anderson *OFS* 12ff.: his discussion of this 'problem', lucid though it may be, never descends to the solid ground of fact.

[73] Except that somewhat longer oars were used amidships (by all three banks!). See Morrison, Coates 1986:138.

of oars to the *dikrotos* oarage and, in association with it, the mounting of the outrigger construction known in the Athenian navy as *parexeiresia* (*SSAW* 81; 83-4). In the trireme, according to the theory, the original oarsmen of the *monokrotos* galley worked their oars through a series of oar-ports at the level of the original gunwale, the second bank over a secondary gunwale at the level of the fighting-deck. In the terminology of the Athenian navy the original bank should be called θαλάμιος, the second ζύγιος, the third and last-added θρανίτης. But this cannot be the order in which these terms came into being. For if one thing is certain, it is that in the development reflected in these terms the *zugioi* must correspond with the original rowers[74] of the *monokrotos* galley: in the Odyssey the ζύγα (the 'beams': see p.44 at n.39) serve as rowing-benches. That is to say that in the genesis of the *dikrotos* system behind the Athenian trireme either the *thranitai* or the *thalamioi* were added to the original *zugioi*, and in my view the priority of the former is practically certain. To make this clear I shall have to say something about the context in which these terms came into being. This again brings me to the deck.

To begin with *thalamios*: according to Pollux the θαλάμιος rowed in the θάλαμος (I 87), that is to say the hold or cargo-room. Here the use of the term *thalamos* implies that a deck was present[75]. Though this cannot of course be literally true, it seems clear that the rower beneath the *zuga* could only be so named after the ship's hold had been named *thalamos*, because it had been decked in: once the hold had that name, it probably was so called even if no deck was present, hence *thalamioi*. But, as I have argued (p.44f.), the fitting of the deck in itself had already led to the shifting of the original rower's seat away from amidships and upwards on to a bench (Ill.3b), that is to say that in this way the thranite oarsman made his entry[76]. I assumed that there was room for this shift in the widened *eikosoros*. The trireme, however, the ship in which we meet

---

74 Köster's *Urrojer* (see 1923: 105)

75 The meaning of *thalamos* is 'enclosed room': it occurs as 'apartment' (*Od.*I 425), 'bedroom' (*Od.*IV 310), 'bridechamber' (*Il.*XI 227), 'store-room' (*Il.*IV 143), 'sepulchral chamber' (S.*Ant.*804) and 'inner shrine' (Luc.*Syr.D.*XXXI). As a nautical term it is used by Timaios and Achilleus Tatios. Timaios' story is about a drunk who imagines himself on board ship during a storm and in his fright throws himself 'deep into the *thalamos*, there to lie as low as possible'(*FGH* 566F149); in Achilleus' novel the hero takes parts of the ship, which carries him and his bride, as symbols for marriage (V 16.4). LSJ, citing Timaios and Pollux only, translate *thalamos* as 'the lowest, darkest part of the ship, the hold' ('darkest' is without foundation).

76 It is interesting to see that Pollux emphatically associates the thranites with the deck: τὸ δὲ περὶ τὸ κατάστρωμα θρᾶνος, οὗ οἱ θρανῖται (I 87).

the thranite in fact, was not, or not appreciably, widened in comparison with the pentekontor[77]. Room for the thranite, that is: the purchase he needed for his stroke, must have been found in another way. It is here that the *parexeiresia* comes in. When the thranite was seated near the gunwale, his purchase was preserved by fixing his thole on a ledger parallel to and outside (παρεξ) the gunwale, that is to say on the long sides of the more or less rectangular frame that in Athens came to be called παρεξειρεσία (Ill.7a[78]).

Such a solution (Ill.8) of the problems the deck caused to the oarage was much superior to that assumed above (p.45 and Ill.3b) for the *eikosoros*, because it could be employed for a galley that was not widened just as well as for the *eikosoros*. By this means it became possible to deck in the average, 'Homeric', galley to make it a far more useful ship than the open type. It had a good deal of the advantages of the *eikosoros* where cargo was concerned (except that the hold was not widened), but these benefits did not entail loss of speed or manoeuvrability. This type of ship was therefore in no way inferior with regard to naval action (and in one respect will even have been superior: its hatches could serve as a fighting deck[79]).

Because of these advantages the *parexeiresia*, once it was invented, must soon have been generally adopted, even by shipowners for whom the decked hold was not indispensable, but who appreciated still another asset, viz. the longitudinal stiffening which the construction effected[80]. Among these partisans will soon have been naval boards who naturally were not interested in the cargo-hold, decked or not, but will have reintroduced the zugian oarsmen and so created the first *dikrotos* galleys.

Again, non-military needs may have led to the reintroduction of the zugian oarsmen: as I have already noted (p.53 and n.63), ships rowed on the *dikrotos* system were particularly suited to passenger transport

---

77 In the latest variant of Morrison's reconstruction (1986: Ill. 57) a rather drastic widening amidships is assumed, but in the schematic cross-section in *GOS* Pl.25 (= my Ill.5) the widening is minimal. I have no doubt that the scaling-up which marked off the trireme from e.g. the pentekontor will have involved some widening too, but not too much, for the intended effect of the trebling of the oarage—speed and impetus—would be jeopardized if the ship itself lost its slenderness.

78 See Morrison 1947: 125ff. For the mechanical principles involved see also Köster 1923: 106-7.

79 This type of galley is perhaps pictured in Ill.12 = *GOS* Geom. 2: the figure standing in Williams' space X (see *GOS* p. 14, figs.1 and 2) could be standing on the hatches. The same is true of the fighters on the left-hand galley of the Aristonothos vase (Ill.2).

80 This will also have been a factor in the adoption of the deck: see *SSAW* 52.

and this type might well have begun its career as a large ferry-boat, the passengers normally pulling an oar themselves[81]. But it is more probable that here the stimuli were martial: the two-banked oarage and the much greater speed it made possible came in especially useful for pirates and their opponents, the naval boards of *poleis,* who of course could use the type for regular warfare too.

The question is now whether ships with *parexeiresia* and with thranite (and/or zugian) oars can be recognized in our pictures. This, I hold, is indeed the case. The pictures in question (Ills. 9-15[82]) have up to now been taken as illustrating the *thalamios/zugios* system (*SSAW* 53ff.) or as depicting *monokrotos* galleys (*GOS* 12ff.). One feature is particularly important: it has been described by Casson as 'a thick black band outlined by two thin lines' (*SSAW* 52). Williams, who has devoted much time and energy to its interpretation, takes it to 'represent the far side of the ship', that is to say that, when two banks of oars are pictured as in Ill.9, he takes such ships to be *monokrotos* galleys (*GOS* 23). Williams' theory is endorsed by Gray (1974: G 86ff.), but has been rejected by Casson: with Casson's discussion (*SSAW* 71-4) I find myself very largely in agreement. His chief argument is the similarity of the ships *GOS* Geom.43 and 44 (= Ills.11 and 10) and *GOS* Arch.1, which show a variant of the 'thick black band' and are recognized as *dikrotoi* by Williams himself (*GOS* 37, 39). I add two other arguments. In the first place there are pictures showing only one row of oarsmen, according to Williams either that on the far or that on the near side, where a similar one has two (Ills. 14 and 15 compared with 9): especially the first of these pictures is strange if it represents the starboard (far side) rowers, since the legs of the oarsmen appear to be covered by the ship's far side: are we to suppose that they were outside the ship? In the second place—this is something also noticed by Williams —the treatment of the tholepins is inconsistent with his theory: whereas both gunwales ought to be furnished with tholepins, these are to be found, if at all, on his 'near side' only (Ill.12, cf. *GOS* Geom.4). Williams explains this, following a desperate suggestion of T.B.L. Webster's, by assuming 'that ... the viewpoint for the far side of the ship was from directly above, in which case its tholepins would not be represented' (1958: 123).

Casson's view is that all these pictures represent *dikrotos* galleys.

---

[81] As Lucian seems to have considered normal practice: see *Cat.* XIX; *Cont.*I. The same consideration may well have led Demeas, or his source, to assume that the 50 Milesian envoys of Archil. fr.192W travelled in a pentekontor (see p.45 n.43).

[82] = *GOS* Geom.2, 8, 9, 10,.11, 43, 44.

Accordingly he interprets the 'thick black band' as part of the ship's side, that is 'heavy planking, and ... wales that girdled the ship laterally for added strength' (*SSAW* 52). This view certainly is attractive and *SSAW* fig.69 is an eloquent argument for it. It, moreover, explains the features that are incompatible with Williams' theory: when only one bank of oars is pictured, we may take it in any case as one of the near side banks, presuming that *dikrotos* ships were often rowed on the *monokrotos* system; when in Ill.14 the upper bank does not use the 'Homeric', key-shaped, tholepins of the lower bank of Ill.12, that does not imply, as in Williams' theory, any lack of symmetry between port and starboard gunwales. Still there are three difficulties with Casson's view. It is not clear why such strengthening was fastened so far above the gunwale, thus raising the ship's metacentre, nor why the ports of what became the lower bank of oars had to be so colossal (this makes the wale above these ports doubly puzzling[83]); thirdly it seats the *thalamios* on the *zugon*.

My own explanation of the 'broad band' is that it is the longitudinal part of the *parexeiresia*, in other words the ledger (supported by a series of stanchions) over which the thranite oars were rowed. Such a ledger—a broad plank—I have drawn in Ill. 8, which represents a merchant galley with *parexeiresia*. Viewed from the side there would not be much difference between such a ledger and Casson's wale. Both explanations of the 'broad band' seem to me to be superior to Williams' theory, but the *parexeiresia* hypothesis appears preferable because it solves all the problems raised so far.

If this hypothesis is accepted, other pictures may be interpreted in the same way, e.g. Ills.16 and 17 (= *GOS* Geom.42 and Arch.2). The first of these pictures represents a *dikrotos* ship rowed by the thranites only (the *parexeiresia* is painted as a white band, Williams' 'top of the gunwale'), is particularly interesting because, unlike what is the case in Ill.12, the zugian and the thalamian tholepins are alike. This suggests that the difference already discussed is not functional: when the *parexeiresia* was installed, no special tholepins were fitted, the tops of the stanchions being used as such. Ill.17 represents a *monokrotos* galley with *parexeiresia* as in Ill.14; the oars are connected with the *parexeiresia* by 'short parallel oblique lines' (Williams *GOS* 73), suggesting the τροπωτῆρες (tholepin straps) rather than tholepins[84]. As the *parexeiresia* must have been a

---

[83] If strengthening the ship was so important, one would expect no more than the small oarports the Athenian triremes had.

[84] The warriers with shields are a curious feature, since they are in the position of the oarsmen. But we see part of the ship only: it is possible that oarsmen were at the other oars. The situation could be comparable with that of the galley pictured

considerable improvement of the galley, I would imagine that practically all the archaic pictures represent ships furnished with it: the character of the pictures, however, makes verification of this assumption difficult. Ironically enough the *parexeiresia* is seen clearest in some pictures where the oars are not drawn, e.g. Ills.18 and 23[85].

To sum up: I hold that the *parexeiresia* and the thranite bank of oars made their appearance in the Greek world during the middle of the eighth century at the latest, as did the *dikrotos* galley: the date of the vase paintings is the terminus[86].

A very interesting question concerning the *parexeiresia* is whether it was restricted to the Greek world, or, at any rate, was unknown to the Phoenicians, as has been claimed recently[87]. The evidence on which this claim is based consists in a number of ship representations in Assyrian reliefs—(part of) one is preserved in the original (Ill.19 = Brit.Mus. no.124772 and *GOS* Pl.22a), the others in modern drawings (Ill.20)[88]—and on Phoenician coins. The ships represented in the reliefs probably are Phoenician *dikrotos* galleys employed by king Luli of Tyre and Sidon. These ships are of particular significance because they have been authoritatively and persuasively interpreted as having a *parexeiresia*; because furthermore they are very nearly contemporaneous with the pictures of Greek galleys for which I have just proposed the same

on the cup of Ill. 1 as interpreted by Casson (*SSAW* Ill.81-82 and p.128ff.).

85 In these pictures the broad band (plank) has been replaced by a double line (rail).

86 In Van Doorninck's opinion 'few if any scholars will be at all persuaded' by this hypothesis. If that proves true, the chief reason will be that my eighth-century *parexeiresia* has no recognizable *epôtides* (catheads: see Wallinga 1956: 27). The belief that these are an intrinsic part of the construction probably is wide-spread (and explains Williams' curious preoccupation with the 'cathead position'), but in my opinion it is extremely improbable that the early *parexeiresia* had such a front (a strong beam projecting across the bows). Such a thing was more dangerous than useful as long as there was no question of *diekplous* tactics (on the use of the catheads in this manoeuvre see Wallinga 1956: 33). As these tactics most probably were invented by the Phokaians in the middle of the sixth century (see p.73f.), there is no need to look for catheads/*epôtides* in geometric or archaic ship-representations (cf. e.g. *SSAW* Ill.73) and this gives room for my alternative interpretation. I do not pretend to be certain how the fore-part of the construction was formed, but pictures like Ills. 16 and 17 suggest that the ends of the fore-and-aft ledger (and the double rail which succeeded it: see Ills.18 and 23) were integrated in the construction of the prow and poop decks, Homer's *ikria*).

87 See Basch 1969: 139ff., 227ff. Cf. 1987: 316.2.

88 One made by Layard himself, the others by draughtsmen in his service. See Layard, *Monuments of Nineveh* I, Pl.71 and Barnett 1969: 6-7 (also Harden 1963: Pl.50). There has also been preserved a photograph 'which shows <a different> part of the original slabs' (see De Graeve 1981: 67-68 and Pl.XLI, fig. 87a).

interpretation; and finally because they hint at an essential accessory of the *parexeiresia*. For these reasons I consider these representations as the touchstone for the theory I am presenting.

That these ships have a *parexeiresia* was seen and argued by A. Salonen[89], whose cross-sectional drawing, though technically not very satisfactory, is absolutely convincing on the essential point (Ill.21a). Although he does not use the word *parexeiresia*, Salonen's meaning is perfectly clear. He assumes that the second bank of oars was placed higher and farther to the side of the ship: 'Um den in der oberen Reihe sitzenden Ruderern die Arbeit zu erleichtern, d.h. um den oberen Hebel des Riemens ... zu verlängern, wurde das Auflager für die Riemen der betreffenden Ruderer ... *etwas über die Schiffswand hinausgeschoben*. Darauf deutet nämlich m.E. die unterhalb der Ruderer gezeichnete Linie hin'. There cannot be any doubt about the meaning of the words I have emphasized: they have been borrowed from August Köster's discussion of the genesis of the thranite bank of oars and the *parexeiresia* (1923: 106-7). Köster by the way denied that the 'Assyrian' ships had a *parexeiresia*, for which he is censured by Salonen!

The significance of Salonen's interpretation has escaped Casson and Basch[90]. Basch seems to endorse Salonen's explanation of the 'unterhalb der Ruderer gezeichnete Linie': 'There can be no doubt that the horizontal line ... marks the beginning of the widening of the hull, but it must be admitted that we do not know the exact nature of this' (1969: 148; cf. 1987: 316.2). In reality, however, 'widening of the hull' is a distortion of Salonen's meaning. The misunderstanding is most unfortunate, since it is a very important element in Basch's theory that Phoenician galleys were radically different from Greek ones. In Basch's view the long and narrow galley, the true 'longship', was confined to the Aegean: the Phoenicians 'for reasons easily understood had less need for such ships and Phoenician naval construction tended towards a mixed type'(1969: 150). This assessment is based on two arguments: 1. Greek galleys did not have a complete deck until a relatively late period; 2. the very narrow hull of Greek galleys was strengthened by means of wales (1969: 141). Phoenician galleys, according to Basch, did have a complete deck and could have it because they were broader in the beam than Greek longships. For the same reason (I presume) they did not need wales.

These arguments, however, have no foundation. Basch himself gives

---

89 1939: 39-40. The drawing of his reconstruction is reproduced by Casson in *SSAW* fig.75 and by Basch 1987: 317.1, fig.667. An alternative is drawn in Ill.21b.

90 See *SSAW* 57; Basch 1969: 147f. and 1987: 316.

no reasons, easily understood or otherwise, why Phoenician naval boards had less need for fast ships than their Greek counterparts and had to be content with a 'mixed type'; not to mention that Greek galleys, if not of mixed type (whatever that may mean), in any case were of different types in a variety which may well have corresponded to that in the Phoenician world. I need not argue that Basch's wales are identical with Casson's 'black band' and my *parexeiresia* and that, if Salonen's interpretation is accepted, the ships of the Assyrian reliefs were not different from the Greek galleys of the time. And this applies also to the deck: what Thukydides says of the Athenian triremes of 480, that they did not have overall decking (I 14.3), is precisely what the relief says about at least one Phoenician ship. This high deck has been interpreted by Salonen as not covering the full width of the ship and this interpretation must be accepted. The deck is supported by stanchions and in the relief the arms of the rowers pass in front of the stanchions, so that these must be set more to the middle of the ship than the rowers' benches (see Salonen 1939: 40). Basch to be sure rejects this argument 'because the Assyrian artist treated these stanchions with great freedom; in the ships with rams in the engraving they are always omitted, while most of the "round" ships have them between each pair of rowers' (1969: 148, cf. 1987: 316f.[91]). This, however, is not a sound argument: first a modern drawing is preferred as evidence to a real monument; then what is attributed in the modern drawing to one type of ship is applied to another type!

There is only one point of Basch's which is based on sound observation: this is the absence of 'wales', although in my opinion this is true of the Assyrian reliefs only, not of other Phoenician ship representations[92], and for that reason is insufficient basis for Basch's generalization. The problem involved may be stated as follows: if the ships of the Assyrian reliefs have a *parexeiresia* as argued by Salonen, and if in Greek pictures the *parexeiresia* construction can be (mis-)interpreted as wales, why is there no trace of such 'wales' in the Assyrian reliefs? The obvious answer to this problem is that in the Phoenician ships the *parexeiresia* is covered up by something which puts the construction out of sight. This something must be what in my opinion was an essential

---

[91] By the 'engraving' Layard's drawings are meant: cf. p.59 n.88.

[92] In particular the coins (Basch 1969: Pl.7: 1987: 320ff.). Basch's interpretation of these most difficult effigies leaves much to be desired: not only are what I would call 'wales' clearly visible, but there is absolutely no certainty that the ships represented are triremes as he assumes (cf. Morrison, Coates 1986: 38 n.10), and this also applies to the terracotta model (Basch 1969: Pl.9; 1987: 328ff.).

accessory of the *parexeiresia*, viz. the screens (*pararrhumata/parablêmata* as they were called in the Athenian navy: cf. *GOS* 302; *SSAW* 88, 249) which were fastened under the *parexeiresia* for the protection of the oarsmen against incoming water (see p.53). Since the thranite oarsmen were seated right up to the ship's side, they were much more exposed to spray than the zugians of the old *monokrotos* galley. I assume that measures against this were taken from the start, the more so because protective measures were taken in the *monokrotos* ship as well: Odysseus already 'fenced his ship from stem to stern with wicker mats to keep out the waves' (*Od.*V 256-7). Such wicker mats will have been used in open galleys generally to protect men and cargoes. Most probably they were used under the new *parexeiresia* by the Greeks too: below the ledger of the *parexeiresia* in Ill.10 'there are verticals which form rectangles; every other rectangle is divided into small squares' (*GOS* 37): these rectangles with squares could well represent wicker mats. Such mats were practical on *dikrotos* ships, where a continuous screen would preclude the use of the zugian oars. Continuous screens could be used on *monokrotos* galleys with *parexeiresia.*

Ships with such screens appear in other pictures. Ill.18 (= *GOS* Arch. 52) has a band of different colour below what is called the gunwale by Williams (*GOS* 93) and on my hypothesis is the *parexeiresia.* This band will be a *pararrhuma.* This interpretation has already been proposed for a similar band on a late-Corinthian figured krater-rim (Ill.22[93]) and is supported by Ill.23. Here two ships on either side of an Attic black-figure cup have a red band below a similar 'gunwale', i.e. *parexeiresia,* as in Ill.18. In this band appear what Williams calls 'semicircular ports' exactly between the stanchions of the *parexeiresia* construction. These cut-outs are best explained as gaps in the *pararrhuma* through which the zugian oars passed (the semi-circular form corresponds to the trajectory of a point on the oar just outside the thole). Ill. 21b represents the cross-section of such a galley: the thick line outside the *parexeiresia*—which has two horizontal bars instead of one plank as the 'ledger' (see p.59 n.85)—is the *pararrhuma.*

In the galley of the Assyrian relief the *pararrhuma* appears to cover the *parexeiresia* up to the tholes of the thranite oarsmen: the place where the zugian oars pass through is not clearly marked, but it seems possible that the *pararrhuma* was made of two strips of material, set against each other lengthways, so that the zugian oars could pass through where

---

[93] See Charles K.Williams II and Joan E.Fisher, Corinth 1972: the Forum Area, *Hesperia* 42 (1973), 13f.

they touched. An arrangement like this seems to be depicted in *GOS* Pl.22b, where the zugian oars pass through a sort of slit[94].

The ships of the Assyrian reliefs can thus be interpreted as analogous to those in the Greek pictures of the late eighth century, as here interpreted. The oarage of these ships, combining the thranite and the zugian banks, is exactly what the analysis of the Athenian terms leads us to expect for the first *dikrotos* system. The explanations of these three categories of data may therefore be said to converge. The conclusion must be that at the end of the eighth century the zugian-thranite system of *dikrotos* oarage, including the *parexeiresia*, was in existence both in the Greek world and in Phoenicia.

3. *Conclusion*

The upshot of this analysis is that at the end of the eighth century there was in existence a range of ships (sea-going ships: smaller and less seaworthy boats of any description are not my concern) in which at least four classes may be distinguished under two heads:

1. *Monokrotos* galleys:

1a. General purpose galleys as described by Homer, powered by up to perhaps 40 (Ill.24[95]), but on an average 20 oars; normally provided with a *parexeiresia*. This category may be comprised in Thukydides' *ploia makra* and will have included the majority of naukraric ships.
1b. Specialized merchant galleys, Homer's *eikosoroi*, powered by 20 oars and fitted with deck and hatchways, possibly in two types, one with and one without *parexeiresia*[96].

---

[94] In Layard's drawings (my Ill.20: see p.59 n.88) the zugian oars pass through small rectangles that have no counterpart in the relief (Ill.19). Here there is reason to distrust the draughtsmen: the rectangles are much too small to allow for real movement of the oars. I suspect that the rectangles represent what in reality were mere slits (traces of such slits are visible in the relief). If the *pararrhuma* of these ships was indeed of the kind just indicated (two strips of material set against each other lengthways) the passage of the oars would cause slight widenings of the seam between the strips. These widenings would seem to have been mostly suppressed (or at least not accentuated) by the sculptor of the surviving relief, but they may have been more visible in the lost one: this perhaps explains Layard's rectangles.

[95] If this anomalous picture represents a *monokrotos* galley with *parexeiresia*, which in my view is probable (though I feel less certain than in Wallinga 1990: 136): in other words it represents a galley like that of Ill.16, which has a *parexeiresia* and the thranite, but not the zugian, oarsmen (but does have the zugian tholes). I am not sure that the number of oarsmen must be taken seriously: just as in the galley in Ill.16 the oarage has been emphasized at the cost of the decks fore and aft.

[96] What I suppose to be the merchant galley of the Aristonothos vase—Ill.2—has

2. *Dikrotos* galleys

2a. General purpose galleys, as varied in size as class 1a (witness e.g. Ill.16, which shows a ship with 19 thranite oarsmen to a side: but see n.95), often rowed on the *monokrotos* system (Ill.17), used primarily as passenger transports (ferries), but as well as (perhaps specialized) freighters (see Hdt.I 163.2 and ch.IV.1) and usable for purposes of the state. This category will have been the other component in Thukydides' *ploia makra* and the chief target of the treaty clause in Th.IV 118.5.
2b. galleys in the possession of *poleis*, not different in construction from class 2a, but more uniform in size and more specialized in equipment: Thukydides' pentekontors/ (*ploia*) *katapharkta*.

The data on which this analysis has been based—linguistic, iconographic and literary—are contemporaneous, the terms for banks of oars and the term pentekontor excepted. But ships of pentekontor size are represented in the pictorial tradition (Ill.14 = *GOS* Geom.9 and *GOS* Geom.17, with 14 thranite tholes and 13 thranite rowers respectively, cf. the frontispiece) and this in combination with Homer's testimony for the term *eikosoros* makes an eighth century date for the term *pentekontoros* very probable. If, moreover, the *parexeiresia* has been rightly dated to the eighth century, the terms going with it—such as *zugios* and *thranites*—may well date back to the early seventh, if not earlier.

As will be clear, this analysis must lead to the conclusion that the degree of differentiation reached by the late eighth century, however unmistakable it may be, remained modest, as is indeed the impression one gains from the vase pictures even for much of the archaic period. In particular there is no serious reason to assume any sharp distinction between 'warships' and 'merchantmen', although institutionally these categories will have been different enough. That is why it remained possible that the term pentekontor, which in the fifth century traditions was firmly associated with the *polis* navies, could still be used in the later sixth century for the merchant-galleys of the Phokaians, and perhaps even for Polykrates' *samaina* (see p. 97f.), which employed the large crews associated with the state-owned ships and were denoted by the term pentekontor.

It goes without saying that the developments which led to the variety

---

a rail supported by ten stanchions (the crew standing on a deck, or hatches, at the same level); although no tholes are drawn, they might be supposed at the top of the stanchions as in Ills.14 and 16. That would make the ship an *eikosoros*.

in ship types just summed up *could* reach back to an even earlier period than the eighth century. It is in particular impossible to say with certainty that the *parexeiresia* is an eighth century invention and not something belonging to an earlier period, possibly even surviving from Mycenean times, when merchant shipping must have been sufficiently developed for the want of a full deck to make itself felt. There is hardly any evidence to confirm such an assumption (unless *GOS* BA2 is taken as a ship with *parexeiresia*: not a very rash assumption), and in view of the very sharp decline of Greek trade after the Mycenean collapse, it is perhaps safer to think in terms of new developments and to associate these developments with the economic progress of the eighth century, as does Thukydides (I 13). Thukydides, of course, does not specifically refer to the developments mentioned: his subject is the development of sea-power, not of the ship. But the former was undoubtedly bound up with the latter, and as I already suggested may well be the consequence of the latter (see p.22f.).

Just as uncertain as the time of the important developments treated in this chapter is the question of their originators. If I have correctly dated the invention of the thranite oarbench and the *parexeiresia* to the middle of the eighth century or earlier because *c.*760-*c.*735 is the date of the earliest Greek pictures of these fixtures, the fact that these early representations are Greek does not of course mean that the inventions are also to be ascribed to Greeks. I definitely do not think that the evidence we now possess allows us to decide whether the 'copyright' belongs to Phoenicians or Greeks. I do indeed hope that this futile dilemma, which in view of the increasing contacts of the two peoples during the Dark Ages is not likely ever to be eliminated for that period, will vanish through the finding of proof—preferably both in the Levant and in the Aegean—that Bronze Age ships already were equipped with these devices.

CHAPTER FOUR

THE NEW GREEK SEA-POWERS OF THE SIXTH CENTURY BC

After treating Corinth's pioneering role in the development of early *nautika* Thukydides goes on to report on the other important Greek sea-powers before the reign of Darius I: 'Later <than Corinth> Ionians also had great naval power. In the days of Cyrus, the first king of Persia, and of his son Kambyses they had the mastery of the sea in their neighbourhood for some time when they were at war with Cyrus: that is to say that Polykrates, who was tyrant of Samos at the time of Kambyses, subjected a number of islands by means of his navy and in particular took Rheneia which he dedicated to the Delian Apollo; and that the Phokaians when founding Massalia vanquished the Carthaginians in sea-battles' (I 13.6).

This passage is taken by Gomme (and other commentators[1]) in the sense that 'Ionians' signifies the Ionians in general, including such sea-powers as Miletos and Chios as well as Samos and Phokaia (*HCT* I 123), but this interpretation seems very unlikely. Not only that there is no unmistakable trace in the tradition of the navies of Miletos and Chios[2], but as I have made clear in my translation Thukydides' words are to be taken in the sense that the vague 'Ionians' is made explicit in 'Polykrates' and 'the Phokaians'. If Thukydides had known about other sea-powers which could be compared with Corinth (and were not mentioned as such by Herodotos), he would no doubt have named them,

[1] See e.g. Krüger: 'besonders den Phokaiern ... , den Milesiern ... , den Inselbewohnern ...' ; Poppo-Stahl: 'Praecipue Phocaeensibus, Milesiis, Samiis, Chiis'; Marchant: 'those of Asia Minor, among whom the Phocaeans and Samos are specially mentioned'; de Romilly: 'Les Ioniens, eux aussi, eurent plus tard une flotte importante ... Polycrate, à son tour, ... Enfin, les Phocéens ...'. For my interpretation of the second part of the sentence, in particular of explicative καί ('that is to say that'), see Trenkner 1960: 34ff., who quotes as one of her examples of this usage Th. VI 26.2.

[2] Herodotos does not mention Chian ships or sea-power at all. It is true that he asserts that Miletos withstood the attacks of Alyattes of Lydia because it was master of the sea (I 17.3), but this 'mastery' it owed as much to the fact that Lydia had no fleet (cf. I 27.1ff.) as to its own naval arm (which no doubt was comparable to that of Aigina or Athens: see p.29). It is significant that Herodotos has no detailed information whatever concerning the Milesian, and no information at all concerning any other Ionian *polis*' navy (except the Phokaian), and that no Ionian navy is mentioned in the context of the Persian conquest of Ionia. Gomme's comments on Th.I 13.6 miss the point entirely.

like he expressly mentions Corinth itself, a subject concerning which he could supplement (not to say: correct) Herodotos. Corinth evidently was the only sea-power for which he had been able to collect new and sufficiently respectable evidence to do this, but even in this case it must have been Herodotos' account of the 'lend-lease' contract between Corinth and Athens (VI 89: see p.26ff.) that put him on the track: such hints were wanting for Chios and Miletos (and other Ionian *poleis*)[3].

In a word, the 'great naval power' of the 'Ionians' is identical with that of the Phokaians and Polykrates, which I now shall describe.

1 *The Phokaians and their pentekontors*

Regarding the different types of ship in use in the archaic period there is, as we have seen, very little detailed information: a precise term of classification like *eikosoros* is unique. But there is one important exception: Herodotos' testimony concerning the pentekontor. In his account of the conquest of Ionia by the Persians, which started with the subjection of Phokaia, Herodotos touches on the history of that city up to the time of the Persian attack and then retails what happened to the Phokaians during and after it (I 163-67). In this connection attention is paid to the pentekontor.

According to Herodotos the Phokaians had been the first Greeks who used to make long voyages and had explored the routes to and through the Adriatic[4] and to Etruria, Spain and Tartessos. They made their

[3] That is to say that Thukydides had serious reasons for writing as he did: he no doubt knew that the so-called Ionian fleets at Lade were not *polis* navies. Roebuck explains his passing over of these fleets as follows: 'These emphases are perhaps to be explained by the nature of Thucydides' analysis. It is primarily in terms of naval power in war ... Further, his views are formed from his estimate of the efficiency and uses of Athenian naval power in the fifth century. From his point of view, Ionian naval power was effective for the islanders in the time of Cyrus and Cambyses; it did not attain its proper end during the Revolt, while before Cyrus there was no occasion for its use in large scale warfare' (1984:21 n.7). Apart from making Thukydides a mere trumpeter of Athenian glory (which he precisely is not in these chapters!) this verges on the absurd: as if the Ionian fleet at Lade was not 'naval power in war' and as if the Ionians would not have had as much occasion for large-scale warfare as Corinth (and if not, why then the navies ascribed to them??).

[4] I take Herodotos' Ἀδρίην as the sea between the Peloponnese and Sicily. Exploration of the conditions prevailing in this sea had to precede the routine crossings of Herodotos' round ships. The term was used to refer to the southern part of the Adriatic Sea by Hekataios (*FGH* 1F93, 101, 102b) and Herodotos' use of the term may here be of Hekataian inspiration; elsewhere he applies it to more northern parts of the Adriatic (IV 33.1; V 9.2). Beaumont's hypothesis (*JHS* LVI (1936), 203-4) that it was the Italian name for the sea also called *Ionios kolpos* still seems convincing to me. A very good mise-au-point on these terms is given by Walbank

voyages not in round (sailing) ships, but in pentekontors. When the Persian threat materialized, they put their families and their movables, profane and sacred, on board their pentekontors and abandoned their city[5], ultimately to arrive in Alalia on Corsica, where they had founded a *polis* twenty years before. There they gained a living by pillaging their 'neighbours' all and sundry, until they were attacked by Etruscans[6] in alliance with Carthage. In the ensuing sea-battle in the Sardinian sea[7] 60 Phokaian ships vanquished an opponent twice as numerous, but the victory was dearly won: 40 ships had been wrecked[8], the twenty remaining ones had their rams broken. Strategically the victory must have been a defeat, for thereafter the Phokaians abandoned their *polis* and after a stay in Rhegion founded Hyele (Elea) in Italian Oenotria[9].

This story throws striking light on the pentekontor and its uses. As I argued earlier (p.34), Herodotos implies that in the hands of the Phokaians the pentekontor had the function of the round ship of his own days, i.e. was fully a merchantman; at the same time it appears to have been tactically equivalent to the men-of-war of the fifth century, because evidently the victory of the Phokaians was due to the ramming tactics which were typical of the first-rate navies of the fifth century[10].

Such a combination of qualities almost seems too good to be true and it may be because of its unexpectedness that modern scholars have tacitly disregarded Herodotos' implication and assumed that the Phokaians made their long voyages in warships[11], thinking that the pentekontor

---

(*HCP* I 173 at Plb.II 14.4).

5 This was their intention, confirmed by a solemn oath (Hdt.I 165.2-3), but more than half of them returned (*ib.*), of course with their ships.

6 I would attach value to the order of Herodotos' words and take the Etruscans as the initiators of the alliance, which is plausible in view of their proximity to Alalia.

7 The usual designation of the battle as 'b. of Alalia' is not in accordance with Herodotos' localization, however imprecise (see the comments of Gras 1972: 699ff.). But I shall follow the usage.

8 Herodotos employes the verb διαφθείρειν. I doubt if this really means 'to destroy' here. The fact that the Phokaians were able to evacuate their families and possessions tells another tale. Powell (*Lexicon to Herodotus* s.v.) renders the verb as 'disable ships', wisely I think. See also for comment on the related term καταδύειν Morrison-Coates 1986: 128-9 (but I do not share their very odd view, which seems to be taken by Starr as well (1989: 22), that ancient warships, in particular the trireme, were unsinkable).

9 On the abandonment of Alalia see J. and L. Jehasse 1982: 247ff.

10 See Wallinga 1956: ch.V and Lazenby 1987.

11 To name only a few: How, Wells I 127; Vallet, Villard 1966: 169; Austin, Vidal-Naquet 1977: 68; Murray 1980: 105; Braun 1982: 20; Graham 1982: 139; Cook 1982: 214; Mele 1979: 64; Shefton 1982: 344 and 346; Bravo 1984: 127; Höckmann 1985: 44.

has to be in that category. This assumption appears to be unnecessary (see p.34). Moreover, the way Herodotos tells the story strongly suggests that there was something extraordinary about the Phokaians on both scores—as traders *and* as handlers of the pentekontor—but modern treatment of their achievement has disregarded the tradition about the battle of Alalia[12]. As a result neither the part played by Phokaia in the Greek expansion to the West, nor their particular importance as naval pioneers has been satisfactorily clarified, nor indeed Phokaia's prominent position in Ionia, which made it the first of the Ionian *poleis* to be attacked by the Persians after their subjection of Lydia and, even before that, had led to its representative being chosen as the spokesman of the embassy the Ionians sent to Sparta to ask for help against the Persians (Hdt. I 152.1). For if really Phokaia was no more than—as is generally assumed—'an extreme example' of the development of commercial relations between Greeks and western 'local chieftains' in the archaic period (see e.g. Murray 1980: 105-6), its prominence in the incipient Ionian resistance and in the Persian strategy is unexpected indeed. Not that I would deny that the Phokaians were important for their trade, but their role in and after 546 suggests political and military prominence which should have been taken into account in the modern assessment of their significance. Indeed, more evidence for this aspect of Phokaia's prominence than is usually suspected has been preserved in Herodotos' summary account of its sixth-century history.

Herodotos was told that, when the Phokaians had come into contact with Tartessos, they befriended the local king Arganthonios to such a degree that he first tried to persuade them to leave Ionia and to settle in his lands[13], and then, when he did not succeed, gave them money to build a wall round their city against the threatening power of the 'Mede' (I 163.2 and 3). On the current views of the Phokaian concern with Tartessos Arganthonios' open-handedness is understandable enough, but his offer to settle the Phokaians in his realm is another matter. If the relationship was of a commercial nature, it was not at all

---

[12] The description of the battle of Alalia in Morrison-Coates (1986: 30) is a travesty. Morrison belittles the achievement of the Phokaians by asserting that their enemies did not use the ram at all and the Phokaians themselves only 'experimentally'. This assertion has no foundation whatever and is in contradiction with Morrison's own (in my view mistaken) conception of the importance of the ram in the development of the Greek warship before the battle of Alalia.

[13] 'Τὰ μὲν πρῶτά σφεας ἐκλιπόντας Ἰωνίην ἐκέλευε τῆς ἑωυτοῦ χώρης οἰκῆσαι ὅκου βούλονται' surely does not refer to the founding of an *emporion*, but to wholesale migration.

in the interest of Arganthonios to uproot the Phokaians. The question therefore is what *was* the nature of this relationship, or in other words what was the profit of both parties.

This question of course has always exercised scholars. Since Tartessos was proverbial for its wealth—wealth in silver[14]—and Herodotos expressly mentions the huge profits of a voyage to Tartessos made by the master mariner Kolaios and his crew *c.* 630 (IV 152[15]), it has been inferred that Arganthonios 'traded the Phokaians silver, probably tin also from the north-west of the peninsula, and perhaps ingots of ready-made Tartessian bronze'[16]. This assumption probably is very widely shared and, although not really verified up to now[17], is indeed plausible. I shall not marshal all the arguments that have been used in this connection—none of which is particularly cogent—but would lay stress on one aspect of the Phokaian activities that seems to have attracted insufficient notice. This is the fact, which in my view cannot be mere coincidence, that the Phokaian long-distance colonizing ventures that had lasting effect were all directed to metal-bearing regions: Massalia at the end of the tin-road coming from Armorica and South England[18]; Alalia near Etruscan iron (and other metal?) deposits[19]; Amisos as a station on the road to the Chalybes[20]; and Emporion near the northern Spanish mining areas[21]. This distribution of Phokaian *emporia* strongly suggests that their founders were specialists of the metal trade, and this again implies that they also came to Tartessos to procure metals in the first place[22].

---

[14] See Stesichoros *PMG* 184: ... Ταρτησσοῦ ποταμοῦ παρὰ παγὰς ἀπείρονας ἀργυρορίζους; Dionys.Perieg.332 schol., *GGM* p.345 Bernhardy: Ταρτησσός, ἣν καὶ ὁ Ἀνακρέων φησὶ πανευδαίμονα (cf. *PMG* 361 and n.). On the significance of Stesichoros' testimony see Shefton 1982: 367f.

[15] On Kolaios' voyage see the important remarks by Humphries 1978: 168; also below, p.79 n.39.

[16] Jeffery 1976: 227. See also Shefton 1982: n.14.

[17] I am not aware that there is proof that metal ware found in the eastern Mediterranean (or Sicily: see Dunbabin 1948: 301) is of Spanish origin. See Shefton 1982: 343 and n.14.

[18] See Villard 1960: 137ff. For tin production in Britanny see Davies 1936: 91-2;; in Britain *ib.*, 140ff., Forbes 1964: 135.

[19] For the iron of Elba (Aithalia) see J.F.Healy 1978: 62; Davies 1936: 68f.; Forbes 1964: 263f. For possible deposits of tin in Etruria see Healy 1978: 61; Davies 1936: 65; Forbes 1964: 136 and S.Bastianelli, *Studi Etruschi* XVI(1942),248ff.

[20] For iron in northern Asia Minor see Healy 1978: 62; Davies 1936: 183: Forbes 1964: 183.

[21] There seems to be no evidence for the exploitation in the archaic period of Spanish iron mines, other than those of Southern Spain (for which see Davies 1936: 94ff.). But the mines mentioned by Strabo (III 4.6 C159), Livy (XXXIV 21.7) and Pliny (*Nat.*XXXIV 149) may have been very old.

[22] See e.g. Burn 1960: 147 ('the western metal-trade') and Villard 1960: 152ff.

Much more difficult, however, is the other side of the bargain: granted the Phokaians obtained metals, what did they give in exchange? The Greek finds in the South of the Iberian peninsula have been exemplarily treated by Shefton. For the period the Phokaians may be assumed to have been active there they include 'East Greek prestige vessels of bronze and ... cups, also East Greek ... <Later> a fair number of Ionian cups, joined presently by some Laconian, both pottery and bronze vessels. Attic too made its appearance ...' (1982: 347-48). But Shefton stresses that grosso modo 'the quality would hardly have justified <the assumption that there was> an extensive trade ... In short we do not yet know the substance of any trade relations between Tartessos and the Phokaians, or what the Phokaians could have offered in return for Spanish silver, if that indeed was one of the trade ingredients' (*ib.*, 350). Because the goods that have been preserved may well represent categories that were least important in the exchanges (in contrast with perishable wares such as textiles), this verdict may well remain the last word for some time to come as far as the exchange of goods is concerned.

But goods are not the only exchange objects to be considered. Services also are archaeologically evanescent (and are never mentioned in this context), but that is no reason to leave them out of account, for it is with respect to services that Herodotos has preserved a valuable and generally ignored clue. This is Arganthonios' invitation to the Phokaians to settle in Tartessos: this invitation suggests a very special relationship which I would compare to that of the Greeks and the Saïte kings of Egypt (see p.85), and that of the Phokaians themselves with other partners. In Egypt Greeks had come as freebooters (Hdt. II 152.4: κατὰ ληίην), but after they had been befriended by the king of the Delta, Psammetichos, they entered his service to conquer the whole of Egypt, were settled by him in two 'camps' on the Nile near the sea (II 154), and were followed by traders, among them Phokaians (II 178). Phokaians figure in a comparable, double-faced, role vis-à-vis barbarians on other occasions: already at the founding of their colony Lampsakos in the territory of the Thracian Bebrykes (*c.*650[23]) the site was given to them by the chief of the tribe in exchange for military support (Charon *FGH* 262F7); and a striking feature in Justin's account of the founding of Massalia is the neighbouring tribes' fear of aggression (XLIII 3.4). This point of resemblance between these traditions seems to me as significant (if not far more so) as the romantic stories about female philhellenism to which Burn has called attention (1960: 146f.; cf. also 108f.).

---

[23] For the date see Busolt 1893: 467 n.3. Eusebios makes its foundation contemporaneous with that of Abdera *c.*653.

Our evidence is far too poor for certainty, but it could well signify that for the Phokaians the 'Egyptian connection' from its start served as a model to be followed elsewhere.

Tartessos of course was not Egypt and it was much farther away, but if it had great repute for its wealth, it could have attracted free-booting Greeks in spite of its remoteness and its king could have tried to persuade the warlike visitors to be his companions in arms just as well as Psammetichos had done. There is no reason to suppose that Tartessos was without enemies: its (conjectured) destruction by the Carthaginians may well have been preceded by a long period of conflict[24]. In such a context Herodotos' story about the Samian Kolaios (IV 152.2-4) fits just as well as in that of trading ventures. In fact it belongs in both contexts at once, for the mercenary who was paid in bar silver or block tin had to engage in trade to exchange it, just as the pirate his booty, for the necessaries of life[25]. 'Trade' in this manner could well be the background of the collective[26] dedication of Kolaios and his shipmates, who are taken together by Herodotos as 'the Samians'. If we assume that the Phokaians combined trade and mercenary service, that would explain both Arganthonios' desire to have them permanently at his beck and call, *and* the Phokaian refusal: assent would bring loss of profits (and little that could be compared with the charms of Egypt[27]). And this assumption would explain more. The combination of soldiering and trading would bring considerably more men to Spain than pure trade. Pentekontors were particularly suited for passenger transport (see p.53 and n.63). Of a ship's company of fifty oarsmen, plus a number of marines and the *hyperesia*, up to thirty men could stay in Spain for one or more years without the ship having to lie up. As the pentekontor essentially was a *dikrotos* version of the twenty-oared Homeric galley (see p.49f. and n.54), a crew of even twenty rowers could handle the

---

[24] See e.g. Busolt 1895: 746ff.; Dunbabin 1948: ch.XI; Warmington 1964: 40ff.; for a different view Blazquez 1968: 234ff. The reconstruction of Tartessian history in the second half of the sixth century by Schulten (ch.7: Die Karthager und die Zerstörung von Tartessos) is based on a medley of circumstantial evidence, some of it very flimsy, but his conclusion that T. was destroyed *c.* 500 (between 530 and 480) seems unavoidable.

[25] See Humphreys (1978: 167): 'The *hetairoi* who rowed <Telemachos'> ship might take *goods for exchange* <my italics> or hope to acquire them abroad by raiding, piracy or military service'.

[26] See Humphries 1978: 168. This raises the question in what way these men were a 'collective' and what was the function of Kolaios in it other than being the *nauklêros* (the owner of the ship or his representative). For a suggestion see p.91.

[27] If Shefton (1982: 355) is right in seeing Tartessos as 'a sophisticated native centre' (in contrast with the Levant coast of Spain), there is perhaps no reason to accentuate the superiority of the attractions of Egypt.

ship, that is bring it back to Phokaia. It is clear that 120 pentekontors, such as the Phokaians possessed before their exodus[28], could move very considerable numbers of men in a season (up to 3500 in one haul!).

I am convinced that the hypothesis just argued does more justice to the tradition as preserved by Herodotos than current alternatives. Even so the evidence leaves much to be desired and so far the hypothesis is not securely founded. It finds some additional support, however, in another unduly neglected part of Herodotos' report. This concerns the Phokaians' naval attainments, and here conclusions can be reached which throw a new light on the whole of their maritime activities. It follows from Herodotos' account of the battle of Alalia that the Phokaians used ramming tactics: the twenty ships not entirely put out of action had lost their rams, which had been wrenched off[29]. In itself this could perhaps be explained without bringing in any tactical concept, although tactics were obviously needed for a fleet of sixty ships to overcome a double majority, but another piece of evidence makes the tactical implications manifest. This is Herodotos' report of the part played by a Phokaian commander, Dionysios, in the Ionian preparations for the battle of Lade (VI 11-12).

Dionysios offered to train the Ionians in such a way that the enemy would decline battle or, *if* he engaged, would suffer a heavy defeat. What he did in practice was to teach them the *diekplous* manoeuvre (*ib.*12.3), in other words to apply ramming tactics of the sophisticated sort typical of the Athenian navy of the fifth century. This is indeed the earliest mention of this concept in Greek tradition. The fact that a Phokaian, and clearly no other Ionian, had command of this concept at this early moment and that therefore this petty admiral of a squadron of three ships had to be entrusted with the conduct of the Ionian preparations,[30], together with the tradition concerning Alalia, very strongly

---

[28] The minority of the population brought at least sixty with them to Alalia (Hdt.I 166.2): the majority that went back to Phokaia must have retained at least as many. I have little doubt that this calculation was made by Thukydides also. It must have been the reason why he named Phokaia in one breath with Samos as one of the big sea-powers of the archaic period. It cannot be excluded, moreover, that more than sixty sailed to the West, for the passengers and large cargoes of the voyage are hardly compatible with the full rowing crews that must have been available in the battle of Alalia.

[29] Herodotos' term is ἀπεστράφατο <sc. αἱ νέες> τοὺς ἐμβόλους: the ships had their rams 'wrenched off' or 'bent back', 'dislocated', no doubt as a result of frequent ramming, and not because the rams were 'at an experimental stage' (Morrison-Coates 1986: 30).

[30] There is in my view no reason whatever to make him commander-in-chief as do Burn (1962: 211), Morrison-Coates (1986: 42) and Murray 1988:488. A more humble assignment is implied in the story of the 'mutiny': a commander-in-chief

suggests that the Phokaians were the creators of this tactical concept. Moreover, the concept must predate their exodus, for there is no indication (nor is it credible) that the manoeuvre was developed after 546 by the Phokaians who had returned to their *polis* in that year. This brings us back to the history of the earlier maritime activities of the Phokaians.

Tactical concepts are not created in vacuo. Strange to say no one seems to have asked himself how and in what situation the notion of *diekplous* and all it entailed could arise. Still that is the crucial question. However we may conceive the manoeuvre[31], it presupposes squadrons of ships with highly trained crews regularly involved in attacking (or defending themselves against) enemy squadrons of comparable strength (or practising for that purpose). Where and in what circumstances are we to suppose the Phokaians (or other possible inventors of the manoeuvre) to have delivered the several battles in which they could develop such a concept? If it was the Phokaians, obviously it must have been in the West; as obviously either the Phoenicians (Carthaginians) or the Etruscans must have been the opponents; since, moreover, the Phokaians did not have important bases near those of their opponents[32], their naval fights would have to be associated with their western voyages, if not specifically with the waters of southern Spain. If they were opposed there by the Phoenicians, they naturally would not have travelled with individual ships, but with squadrons, and when these squadrons were attacked, veritable sea-battles will have ensued. Sailing in convoy is indeed probable, if only because of the dangers of piracy, which were no doubt particularly acute for traders in metals, but once it is seen that the transport of mercenaries was an important element in Phokaian activities, travelling in convoy becomes an almost necessary assumption. Especially if the mercenaries assisted the Tartessians against Phoenician attacks, Phoenician counter-measures were inevitable and fighting of some extent and frequency in the naval sphere to be expected.

---

would have raised his voice; Dionysios is not even mentioned. See Wallinga 1984: 431 n.46.

[31] The manoeuvre has always been taken as a movement of a fleet drawn up in line abreast: see Wallinga 1956: 32ff. Recently J.S.Morrison has launched a new hypothesis which makes the *diekplous* a concerted attack by several squadrons in line ahead. This hypothesis is based on a very one-sided analysis of the battle of the Arginusai: half the evidence (DS XIII 97.3ff.) is left out of account (1974: 21-26 and M., Coates 1986: 87-93), and must be rejected for this reason alone. Cf. Lazenby 1987: 170 and Wallinga 1989: 141ff.

[32] Alalia is the sole possibility, but it seems unlikely that earlier naval warfare in this neighbourhood would have failed to be mentioned in the traditions on which Herodotos based his account.

One element in Herodotos' account of the battle of Alalia may be used to specify the period in which these hostilities occurred. The alliance of Etruscans and Carthaginians had to rely on a large numerical majority to offset the tactical superiority of the Phokaians, with which they evidently were fully acquainted without being able as yet to compete. This suggests that the Phokaian tactical superiority was of recent date. The suggestion is reinforced by Herodotos' dating of king Arganthonios' proposals to the Phokaians: he first urged them to leave Ionia and settle in his territory, but when he could not persuade them and heard of the growing power of 'the Mede', i.e. Cyrus, he offered them money to ring in their city with a wall (Hdt.I 163.3). The threat of 'the Mede' dates both the proposals, and this threat can hardly antedate 546 B.C.[33]. If, then, we take Herodotos' account to the letter, Tartessos by *c.*550 was in such sore need of man-power that its king tried to persuade the Phokaians to settle there en bloc instead of bringing up more mercenaries. This situation was not new then, if my interpretation of the Phokaians' use of pentekontors for their western voyages is correct, but there is no need to date it far back. Regular shipments of troops over one or two decades could well have led on the one hand to the tradition as we find it in Herodotos with its emphasis on the use of pentekontors, and on the other to the development of the tactical concept of the *diekplous*. That would mean that since the years around 560 Tartessos was threatened by a dangerous opponent, for the struggle against whom its king engaged Greek mercenary soldiers and Phokaian sailors to bring them up.

Now the middle of the sixth century has long been seen as the time of the beginning of the Carthaginian Empire and the exclusion of the Greeks from Tartessos and the rest of southern Spain. More Phoenician (Carthaginian) activity in Sicily and Sardinia is recorded from before 550, lasting well into the fifth century[34]. Clearly this was a period when the hostility between Phoenicians and Greeks in the western Mediterranean reached a high pitch: that hostilities then spread to Spain and to the region of Tartessos would not be surprising. This has in fact been

[33] What Herodotos implies is that enough time elapsed between the first manifestation of the Persian threat and the actual Persian attack to enable the Phokaians to build their wall (and first to induce Arganthonios to furnish the money): this seems probable enough. It would mean that we must lower the date of the Phokaian exodus to 543 or 542 (a carefully finished wall not a few στάδιοι long must have taken some years to build), and that of Alalia to five years after that. The delay this chronology implies in the Persian conquest of Ionia is indeed hinted at by Herodotos (I 153.3–4).

[34] See Dunbabin 1948: ch.11; Warmington 1960: 51ff. and now Huss 1992, 18 (Moscati), 116ff. (Bondì) and 124 (Moscati).

argued by Schulten (1950: 72ff), though the evidence is not impressive (see p.72 n.24). In theory a purely Spanish background of the difficulties of Tartessos is not to be excluded, but the invention of the ***diekplous*** manoeuvre makes intervention of a naval power, viz. the Phoenicians, very probable. On the other hand this period coincides with the first part of the reign of the Egyptian king Amasis, when that king, according to a modern view, humoured his Egyptian subjects by reducing the Egyptian dependence, by then traditional, on Greek mercenaries[35]. The Tartessian demand for military support would therefore have arisen at a most opportune moment from the point of view of prospective mercenaries. This could well mean that the use of Greek mercenaries was suggested to the Tartessians by the Phokaians themselves, who must have been well-informed about, and may well have suffered by, the change in the situation in Egypt. If we remember that there are similar cases of military aid in the Phokaian record and assume that this was their speciality, the connection between the collapse of the Egyptian 'market' and the subsequent tapping of a new one is not at all unexpected.

Humphreys has argued 'that archaic Greek trade should be seen as part of a much wider context of exchanges between the Aegean and the world beyond, in which the import and export of manpower were of greater moment than the exchange of goods, and upon which a rigid distinction between "trade" and the transfer of goods through war, raiding, hospitality and gift-exchange cannot be imposed. At the basis of this model is the nexus of relationship between private property in land, the import of slave labour, and the consequent generation of a stream of surplus free manpower which finds its place partly through definitive emigration, but also in temporary activity outside the home city-state in war, seafaring and trade' (1978: 169). In this wider context of exchanges the Phokaians fit perfectly. In comparison with this view the current conception of their trading in warships, which implies the involvement of the *polis* as such[36], seems very much the less probable.

This is not to minimize the purely commercial accomplishments of the Phokaians. If I have correctly described the type of transaction

---

[35] This is the view of e.g. Gardiner 1961: 362; Kienitz 1967: 273; Drioton, Vandier 1984: 583; cf.How, Wells I 253. A different view has been expressed by Braun (1983: 51) who stresses Amasis' reputation of philhellenism and assumes that Amasis' measures really were favours. There is much to be said for Braun's interpretation, but the traditional view is not thereby invalidated. We need only assume that Amasis after a first period of xenophobic policies was forced by the changed circumstances (the rise of Cyrus) to return to the traditional Saïte policy (see Wallinga 1987: 62 and n.53).

[36] Thus consistently, but against their own theoretical point of view, Austin, Vidal-Naquet 1977: 68.

resulting from their activities, they brought considerable wealth from West to East, and moreover wealth of a type that stimulated economic activity. As already argued, the silver or tin or whatever riches the mercenaries sent or brought home, had yet to be converted into daily bread. Phokaia itself will have profited most from this secondary trade. That this trade in the region of Phokaia itself was of crucial importance, at least for Phokaia itself, does indeed appear from Herodotos' report of the Phokaian attempt, when they had decided to abandon their city, to buy the Oinoussai islands (Hdt.I 165.1[37]). This must mean that the Phokaians could plan to subsist on the income from their carrying and trading activities alone[38], for it was especially for these activities that they would need a base near their old homes as a place of call for their customers, military and otherwise. They do therefore truly seem to have been an 'extreme example' of commercial development, but nevertheless very different from the picture usually given of them. Their specialization—for such we may call it—appears to have been made possible by a combination of exceptional factors, foremost among which must have been the enormous distance between Phokaia and its Spanish partner. This distance prevented, or at least made unattractive, interference by others. In the comparable contacts of Greeks with Egypt such monopolization was less easy, hence many *poleis* were involved (Hdt.II 178.2 and 3; see p.98).

On this basis the Phokaians managed to collect the quite notable fleet of some 120 pentekontors (see p.73 n.28), a potential which sufficiently

---

[37] See for this attempt Starr 1982: 435. The Chians refused to sell the islands, because they feared that the Phokaians would make them an *emporion* and that their own island in consequence would be shut out. This I think must be taken literally: not that the installations (chiefly defenses) of the *emporion* would actually block the channels on either side of the Oinoussai, but its fiscal boundaries could easily leave very little passage. No doubt this north outlet of Stenón Khíou was a vital line of communication with the North for the Chians as the chief carriers of Thraco-Macedonian silver (see Roebuck 1984: 34).

[38] I have the impression that the islands could only replace Phokaia's *emporion*, not its *chôra* as well: their area is very modest (14 km^2) and their population at present less than a thousand ('renowned sailors and fishermen'!: *Blue Guide of Greece* (^{4}1981), 645). In the years before the Second World War the total population is said to have been *c*.2500 (1928 census: 2440), which Philippson (1959: 246) considers suspiciously large (174 per km^2: 'Sollte da ein Irrtum vorliegen?'), while the authors of the British Naval Intelligence Handbook (*Greece*, Vol.III Regional Geography (1945), 530) suggest that it was small ('their total population is only 2440'). Philippson's suspicion seems more realistic. Phokaia's population on the other hand must have been far more numerous: its 120 (or more) ships were manned by at least 2400 able-bodied men who must have been citizens for the most part (though I would assume that the whole region around Phokaia contributed oarsmen, in particular Kyme (for the 'replacement' of Kyme by Phokaia see Burn 1960: 145).

impressed Thukydides to make him include Phokaia in his list of important archaic sea-powers (I 13.6). As I shall argue, the comparable power of Polykrates made this potentate acutely dangerous to Persia. Nevertheless Phokaian sea-power is not mentioned in Herodotos' account of the Ionians' attempt to organize the defence of their *poleis* against the Persians (I 141ff.), nor does the Phokaian navy (or Ionian sea-power in general) play any part in that defence itself. Herodotos' silence is the more curious, because he shows his awareness of the importance of sea-power for the independence of the Ionian *poleis* when he reports on the Lydian effort to conquer Miletos and explains its failure by pointing out that Miletos had mastery of the sea (I 17.3) and even more in his retelling of the anecdote about Kroisos' plan to build a navy and Bias' reductio ad absurdum of that idea (I 27). Herodotos in this way makes very clear that naval power was totally absent from the traditions concerning the Persian conquest of western Asia Minor, an absence which has not been explained and indeed has utterly failed to attract attention.

However, when the financial basis of Phokaian sea-power is taken into consideration, it is clear that, as long as that basis remained the same, as long as in other words the Ionians did not replace the Tartessians as the paymasters of the crews, that sea-power could not function in the Aegean context. If one compares the full naval potential of the Phokaians at the moment of the Persian attack with the pitiful squadron of three triremes in the Ionian fleet at Lade, and remembers that Samos still manned sixty triremes in this fleet (Hdt.VI 8.2), it is evident that without Tartessos and after the loss of no more than half its population (Hdt.I 165.3) Phokaia was reduced to virtually nothing. Apparently the other Ionian cities were in no better position in 546 and, although in theory union could have been strength, the time clearly had not yet come for something like the Delian league.

In this perspective it is decidedly odd that mastery of the sea is ascribed to Miletos for an earlier epoch, but it is not impossible that its success against Lydia was explained by fifth-century strategists as due to mastery of the sea primarily on the analogy of the situation in their own times. It is even more odd that Thukydides can suggest that the Ionians were thalassocrats for some time in the war against Cyrus (I 13.6), but it may well be that he here generalizes the thalassocracy of Polykrates, which *is* mentioned by Herodotos at least as an attempt (III 122.2) and is contemporaneous with Cyrus (and Thukydides may have added the Phokaian potential to that of Polykrates to make the 'Ionian' thalassocracy certain).

To return to the period of Phokaian expansion: I assume that Phokaians, following Kolaios' trail, or more probably allured by rumours about a western El Dorado[39], came to Tartessos and were befriended by its king. When Tartessos came under pressure of enemy neighbours backed by Phoenicians, or of the Phoenicians themselves, and the Phokaians offered (or were asked for) help, they started their career of troop carriers, bringing more 'helpers'. Until that time they will have travelled in the ordinary (*monokrotos*) galley of some twenty to twenty eight oars, but now, to accommodate more men on board (and to use them at the oars as far as possible[40]), they mounted *dikrotos* oarage. This not only doubled the capacity of the ships to transport men[41], but also added to their fighting power by increasing their speed and improved the quality of the marines (who were for the picking among the mercenaries). As far as the ships are concerned such a development of the relationship of Phokaia and Tartessos is perfectly compatible with that proposed in Shefton's study on Greeks and Greek imports in the south of the Iberian peninsula. This development thus was analogous to what happened in Corinth when that *polis* created its 'almost modern navy', with this difference that Corinth, and the *poleis* in general, introduced the second bank of oars to increase the speed of its ships, not their transport capacity (see p.50).

---

[39] Kolaios' story is so extraordinary that I doubt if anyone would have tried to follow in his wake. For a man on the way from Samos to Egypt to stray to Cyrene is no small feat, given the prevailing northwesterlies in that area. It is even more a feat to find easterlies to drive one all the way to Spain (see the wind statistics conveniently presented in monthly wind roses in *The Mediterranean*). I do not doubt that Kolaios made the voyage, but I suggest that he tried to discourage others by the misguidance of his report.

'Healthy scepticism towards this story' is also expressed by Beaumont 1939: 80, approvingly quoted by Shefton 1982: 345 and n.21. Shefton's view that Kolaios' association with Kyrene (Hdt.IV 152) is unhistorical and that his voyage to Tartessos was earlier and is to be dated before *c.* 650 on the basis of the finds of ivory combs in the Samian Heraion (344-45) suggests that Herodotos' informants palmed off a conflation of at least two stories on him.

[40] These mercenaries would be comparable to hoplite troops mentioned by Thukydides as *auteretai* (III 18.4 and VI 91.4). Military men of this type—in Athenian terms on the borderline between *zeugitai* and *thetes*—must have been the potential soldiers of fortune par excellence. They will often have obtained their arms and armour from their employers, like the Peloponnesian *auteretai* of Th.VI 91.4 from the Himeraians (Th.VII 1.3). Cf. p.91 n.63 and App.n.12.

[41] Doubled, i.e. on an average. If the Phokaians still used the Homeric *monokrotos* galleys with 20 oars, the mounting of a *parexeiresia* would more than double their capacity. If zugian oarsmen were reintroduced in *monokrotos* galleys with *parexeiresia*, the increase was less. Although I consider the second alternative far more likely, it would be absurd to dogmatize: even if the pentekontor's *parexeiresia* had a maximum capacity of 28 oars, the ships will often have been rowed by fewer oarsmen.

In this connection there is a very interesting document describing a parallel to the use of the pentekontor by the Phokaians, which is situated in the world of their western rivals and not much later than their last exploits in the West, the well-known *Periplous* of the Carthaginian Hanno. The text of Hanno's report, written in the early (?) fifth century and translated into Greek in hellenistic times, describes a colonizing and prospecting expedition ordered by the Carthaginian government along the west coast of Africa. The voyage was made in sixty pentekontors (*Peripl.Hann.I*: καὶ ἔπλευσε πεντηκοντόρους ἑξήκοντα ἄγων καὶ πλῆθος ἀνδρῶν καὶ γυναικῶν ... καὶ σῖτα καὶ τὴν ἄλλην παρασκευήν).

In this case also the use of pentekontors evidently is explained by the adaptability of the type to different tasks. Hanno needed armed men (no doubt travelling as *auteretai*) to defend both the expedition itself and the new colonies, but also civilian settlers, male and female (with their belongings!), who would make the colonies self-supporting (whether they were to be an *emporion* or not), just as he had to be able to continue with smaller crews on the prospecting part of his voyage. The pentekontor, which could be handled by twenty as well as by fifty oarsmen, obviously was as suitable for the decreasing Carthaginian company as it had been for the two laps of the Phokaian round trips.

The use of the pentekontor by the Phokaians made their contribution to Tartessos' defence far more important, so that the Phoenicians must have tried to prevent the ships from reaching Spain and this again will have stimulated the Phokaians to travel in convoy. In so doing they must have gained experience in dealing with attacks and so could develop the tactics of *diekplous*.

It is clear that traders thus specialized had far more chance to evolve such a tactical concept than Corinth had. Notwithstanding the fact that Corinth had great wealth and an early start, waging a naval war at a great distance (including a sea-battle) before 660 and remaining in the front rank of Greek sea-powers thereafter[42], its great fight with Korkyra in 433 (Th.I 49ff.) was fought without *diekplous* tactics 'in the ancient fashion'. This is understandable enough if one considers that for a *polis* like Corinth the mobilization of a fleet of warships was expensive. Rowers had to be paid and large-scale practising was, for that reason, very difficult to achieve while naval war was to be avoided at almost any price. The crews of the Phokaian ships on the other hand must have paid their passage, at the very least in services (rowing and

---

[42] This appears from Herodotos' report on the 'lend-lease' agreement between Corinth and Athens (Hdt.VI 89: see p.26ff.), which makes Corinth very much the biggest sea-power in the early fifth century.

fighting) and not improbably by actually paying money, and as long as the Tartessians would hire the men, the more there came the better. It was not necessary to reduce the number of men in each ship, as was normal in naval operations at a great distance from one's base (see p.174). For this reason the Phokaian ships must have been quite exceptionally well-manned and experiments with tactical manoeuvres for that reason easy to undertake. Obviously what I have said applies to the outward voyage only: on the return trip the ships will have had smaller crews as a rule. The opponents therefore had the choice when to attack: on the voyage out when success meant elimination of the dangerous mercenaries, or on the return voyage when they had a chance to seize the costly cargoes. I would assume that it was more urgent for them to prevent the mercenaries from reaching Spain and easier to bring their enemy to bay when he had to converge on Tartessos. On their return trip the Phokaians would have better chances to elude their opponents, at need by dispersing[43]. Moreover, though their crews were smaller, they would be anything but defenceless. As the battle of Alalia shows, qualitatively superior ships could risk battle against an enemy who was much stronger numerically: a squadron of relatively undermanned ships could therefore leave a number of ships out of their line and concentrate the crews.

No doubt the naval warfare between the Phokaians and the Phoenicians (and their possible allies) to be assumed if the actions of the Phokaians were as they have been sketched here, would have been on a relatively small scale, and this in itself goes a long way to explain the silence of the ancient historians regarding it. Of course, Herodotos' concentration on the eastern part of the Mediterranean has been a factor contributing to this oblivion. Still, Thukydides' assertion that the Phokaians had been victorious over the Carthaginians at the time they were colonizing Massalia (I 13.6) shows that there was some evidence concerning these conflicts other than Herodotos': the drift of Thukydides' words is well brought out in Classen's rendering 'auch waren die Phokaier, als sie Massalia gründeten in den (wiederholten) Kämpfen zur See siegreich über die K<arthager>' (Classen, Steup p.400). It is true that this passage is often thought to refer to the battle of Alalia (as by Steup, *ib.*), but it seems very improbable to me that Thukydides singled out without comment this 'Kadmean' victory (problematical especially

---

[43] Merchant pentekontors with minimum crews no doubt were able to keep to high-sea routes where they could not be easily intercepted. Gomme's 'law' (1937: 190ff.), which concerns the need for galleys to land each day to enable the crews to cook and sleep, holds good for heavily manned line-of-battle ships only.

as reported by Herodotos) to illustrate the great power of the Phokaians[44]. And even less plausible is the recent attempt by Gras (1987) to reduce all traces of hostilities between the Phokaians (the Massaliotes included) on the one side and the Phoenicians/Carthaginians on the other to this one event, thereby robbing Massalia of an important part of its history. Thukydides' victory (-ries) must be a case apart. Nevertheless the absence of more unambiguous evidence for large-scale, memorable battles between Phokaians and Phoenicians before Alalia seems to indicate that the Phokaians had never been cornered with their whole force, because they never travelled with all, or even half, their ships together. When therefore half of them settled in Alalia[45], a quite unprecedented situation confronted the 'neighbours' (Hdt.I 166.1).

As I have argued in my second chapter, the world of the archaic *poleis* did not know standing navies of any size, Corinth excepted: but now such a navy suddenly came into being, not as the result of the deliberate policy of a rival that led to the structural economic changes necessary for maintaining such an arm, but as the consequence of the involuntary emigration of an Aegean *polis* which until then had been no more than a marginal menace. When the Delian league came into being, radical structural innovations are plausibly said to have been necessary to enable it to maintain the permanent patrols of sixty triremes (see Meiggs 1972: Endnote 13) that deterred the Persians from trying to regain their dominance of the Aegean area: the innovations were necessary to 'integrate the manpower required by this permanent military establishment into the economy of the *poleis* that were members of the league by means of profits derived from war and trade'[46]. These 'profits' were in large part surpluses of the member *poleis* converted into monetized tribute. In the Tyrrhenian sea a comparable

---

[44] Gomme rejected the identification with Alalia (*HCT* I 124: 'another event of which we know nothing from other sources'), expressly refuting the view of Steup. Gomme's argument (Alalia was not a true victory, but strategically a defeat; Antiochos, one of Thukydides' chief authorities, calls it a defeat; Thukydides' victory was in any case earlier than Polykrates, so Thukydides is not observing chronological order) is not very convincing. For Thukydides the Phokaian victory is evidence for Phokaia's real power at sea, however ephemeral it may have been, not so much for their general (political) power. Antiochos' more strategical (political) view is not to be followed for that very reason. Polykrates' chronology is much too uncertain to exclude 'that he was in power early in the 540s' (Shipley 1987: 80), i.e. before Alalia was fought.

[45] Less than half of Phokaia's population (Hdt.I 165.3), but all the adult males must have engaged in piracy, including many men who had worked in non-maritime jobs before.

[46] See Humphreys 1978: 169. Note that the innovations already dated from Darius' reorganisation of the Persian tributary system!

'structure' now shot up with the Etruscans and Carthaginians as unwilling tributaries. It is truly amazing that the enormity of this sudden change has not attracted more attention.

In this situation the Etruscans and the Carthaginians must have been desperate to find an adequate response and what they found, the double numerical majority (Hdt.I 166.1), fully demonstrates their plight: such a mobilization was as exceptional as the threat to which it was the answer. The only comparable precedent was Corinth's effort in its war with Korkyra *c.*680-664 and that indeed had engraved itself on the memory of the Corinthians, date and all, though it can hardly have been comparable in scale to that of the alliance opposing the Phokaians (even if Thukydides, and in any case his informants, thought so).

The magnitude of their combined efforts, to be sure, probably was motivated by more than just the Phokaian threat. Continued or recurrent pressure of the Persians on their Aegean frontier could easily bring more Greeks (or even the Persians themselves) to the West. Bias of Priene, for example, was reputed to have recommended the Ionians after their subjection by the Persians to emigrate to Sardinia collectively (Hdt.I 170.2). At the beginning of the Ionian revolt Histiaios offered to conquer the same island for Darius (Id.V 106.6; VI 2.1). For Aristagoras Sardinia was a possible refuge for the Ionians (Id.V 124.2). There was even a rumour circulated later that Kambyses planned to come west to conquer Carthage (Id.III 19.2). These tales may signify little more than that armchair strategists in the fifth century had analysed the Ionian predicament in 546 as well as the Persian position of the years after 525 with due consideration of the Phokaian option. Nevertheless such an analysis must not be considered to be entirely beyond the intellectual capacity of contemporaries. It may well have suggested itself to the Etruscans and their allies from the moment they were confronted by the Phokaian threat. An all-out effort on their part could deter other immigrants, and conquerors too. So when the first effort proved insufficient, they had even more reason to go to all lengths to exorcize the danger. We may have no explicit information as to the steps they actually took, but it is plausible that, whatever they were, they were successful: for notwithstanding their tactical victory at Alalia the Phokaians had to evacuate their Corsican *polis* and to migrate to Hyele (Hdt.I 167.3). In the following chapter I shall argue that the Carthaginians may indeed have tumbled to an idea that solved their problem and then, appropriated by bigger powers, went on to shake the world.

2 *Polykrates and Egypt: the testimony of the* samaina[47]

2.1 Amasis and Polykrates

The career of the Samian tyrant Polykrates has always been treated as a purely, or almost purely, Samian affair[48]. His power and politics are seen as those of the typical Greek tyrant and, in as far as his power was based on his navy, this navy is considered as the traditional naval arm of the *polis* Samos, not in any way as Polykrates' own creation[49]; at most he is taken to have reinforced this arm. Consequently no one seems to have asked himself how Polykrates found the financial means to build, maintain and man the huge fleet of a hundred pentekontors and at least forty triremes that later was ascribed to him (Hdt.III 39.3 and 44.2[50]). Even Eduard Meyer, who was aware that Polykrates' 'Kriegsflotte von 100 Fünfzigrudern' was already 'eine Seemacht wie ... das Ägäische Meer noch nicht gesehen <hatte>' (1936: 721[51]), did not think that this was something requiring explanation. On the contrary: Meyer felt called upon to explain the Athenian tyrant Peisistratos' failure 'sich eine größere Seemacht wie Korinth oder Ägina zu schaffen' by adducing 'kontinentale und agrarische Interessen' (*Ib.*: 720). In Polykrates' case he may have thought that trade and, apart from that, the successful raiding ascribed to him (Hdt.III 39.4) yielded sufficient profits for such a fleet. But if that really was the case, reactions on the part of the neighbours ought to have been far sharper; in particular the outcry of the victims ought to have been less good-natured than Herodotus' story about Polykrates' restitutions (*ib.*) suggests that it was. Polykrates' navy, certainly at full strength, presupposes financial resources equivalent to at least half those of the Delian league and such enormous means cannot be explained as the fruits of depredations.

---

47 Ch.IV.2 is an only slightly modified version of a paper that has appeared in *AH* VI (pp.179-197).

48 An extreme instance of this view is Ure (1926: 90f.): 'When Miletos became subject to a foreign conqueror, the Samians saw their opportunity. They took the place of Miletos not only as chief trading port in the East Aegean but also as the chief opponents of expansion any farther westward on the part of the great eastern power'. This judgement is without any foundation. The perspective of Cook's recent aperçu of Polykrates' rule is just as narrowly Samian (1982: 218-219). And though Shipley recognizes that there existed an alliance between Amasis and Polykrates, he does not make clear what common interest, except trade, bound the men together: military factors are not even envisaged (1987: 86, 91).

49 See Shipley 1987: 69: 'the <Samians> had a large navy', i.e. at the time of the assumed coup d'état of the first Syloson (*c.*590).

50 It probably is often assumed that he had even more triremes, because he would not have sent all his big ships to Egypt.

51 Meyer's verdict on Polykrates is closely followed by Bengtson (1969: 139).

It is surprising that no one has thought of Egypt in this connection. For it is evident that Polykrates' actions in the Aegean, especially those resulting in the capture of towns on the mainland, had great strategic significance in the context of the struggle for power in the Levant, especially after the Persian conquest of Babylonia and the subjection of the Phoenician and Palestinian coast. From that moment on, Egypt was severely hampered in its traditional policy in that area, which since Necho had largely been dominated by considerations of naval strategy and aimed to keep Egypt free of (Asiatic) invaders. The means used in this policy were the fomenting and stiffening of rebellions on the part of the subjects of the power dominating neighbouring Asia in order to contain his armed forces there; the instrument employed was the navy that had been created by Necho[52]. What Polykrates accomplished was precisely what the traditional Syro-Palestinian allies could not for the moment be persuaded to do, and his success was spectacular: the Persian armed forces in western Asia Minor were reinforced to a degree that made their commander—the satrap Oroites—a redoubtable power, much feared by the new king Darius and for that reason put away in a treacherous manner (Hdt. III 127.1ff.). The containment of such large occupation troops far from the Egyptian border (and the corresponding weakening of striking forces) was, as I said, the prime strategic objective of the Saïte kings and for that reason their involvement in Polykrates' actions to be expected. But even historians of Egypt are not alive to this issue and the importance of the alliance between Amasis and Polykrates is consequently played down: Kienitz, who has a very clear understanding of what the Saïte kings tried to achieve, evidently has no idea of the potential of the alliance with Polykrates[53].

This is the more unsatisfactory because there is another—in this case generally acknowledged—reason for Egyptian interest in the region of which Samos was part. Again, this interest is strategic, namely the need to have access to the recruiting area where the mercenaries that Egypt had employed since Psammetichos I were hired. This need had forced the Egyptian kings from the very beginning to enter into contact

---

52 See Wallinga 1987: 55ff. On Necho see the excellent article by Yoyotte (1958), who notes that after Necho's defeat at Karchemish in 605 and the consequent evacuation of Syria 'désormais des vaisseaux rapides permettraient éventuellement d'acheminer aisément des renforts d'élite vers les côtes asiatiques' (372), but does not hazard an express judgement on the naval aspects of Necho's policy.

53 See Kienitz 1967: 275. Gardiner (1961: 362) speaks only of Amasis' friendship with Polykrates and of the story of the ring. Drioton, Vandier (1984: 599) mention the alliance 'sans phrase'. James notes the Persian threat as the rationale of the treaty, but as an afterthought without going into its possibilities (1991: 720 n.223).

with local potentates, in particular with the kings of Lydia, who employed the same mercenaries and presumably had good connections with most of the potential supply-centres[54]. An early alliance between Lydia and Egypt is actually implied in an Assyrian document stating that Gyges 'sent his forces to Tushamilki ...' (=Psammetichos I[55]), then in revolt against his overlord Ashurbanipal. Apart from being on friendly terms with Lydia, the Saïte kings also had to be in league with certain maritime *poleis* whose ships were needed for the transportation of the mercenaries. Here one thinks of the *poleis* mentioned by Herodotos as participating in Naukratis (II 178.2), and in particular of Aigina, Miletos and Samos, the *poleis* that clearly made the most of their connection with the Saïte kings (*ib.*3). Diplomatic gestures, like Necho's dedication in Branchidai of a garment associated with military successes (Hdt.II 159.3), evidently aimed at making these bonds tighter. After the fall of Lydia in *c.*546 the Egyptian king must have been in great difficulties on this score. Not only had the most important of his partners been eliminated immediately after their relationship had been formalised and strengthened in the quadruple alliance described by Herodotos (I 77.2-3), but the recruitment area itself (at least the continental Asiatic part of it) had fallen into the hands of the enemy of the allies, who could not be expected to promote the further hiring of his new subjects. Nevertheless, as the story about Phanes of Halikarnassos (Hdt.III 4) shows, new mercenaries continued to be hired by the Egyptians, men who in the end fought fanatically[56] for their employer (Id.III 11). For this a new middleman must have been found and, to judge by the tradition concerning Amasis, there is no other candidate than Polykrates.

It is certain in any case that there was a close tie between these two men: Herodotos' account of Polykrates' career guarantees that. But this account can tell us more than commentators have extracted from it so far, in particular where Amasis is concerned. For the order in which the early stages of Polykrates' career are presented by Herodotos is significant. First Polykrates rose in revolt and ruled the island with his two brothers; then he eliminated his brothers and became sole master of all Samos and after his seizure of power concluded an alliance with

---

[54] See Hdt.I 77 (Kroisos: ξεινικὸς στρατός); Nic.Damasc. *FGrH* 90F65 (Kroisos: μισθωτοί); Plu.*Mor.*302A (Gyges: a Karian ἐπίκουρος); and Polyaen.VII 2.2 (Alyattes: Colophonian mercenaries). Cf. Braun 1983: 36-7.

[55] See *ARAB* II §785. On the garbled name Tushamilki (for *Pishamitki) see Braun 1983: 36.

[56] In my view fanaticism is implied in the tradition about the blood pledge and its terrible outcome (Hdt.III 11: see How, Wells I 259).

Amasis, the king of Egypt. Presently his power grew and became the talk of all Ionia and the rest of Greece. All his military undertakings succeeded; he obtained a hundred pentekontors and a thousand archers; he plundered all and sundry (III 39.2-3)[57]. This strongly suggests that only when Polykrates had ousted his brothers and made a bargain with Amasis, did he become really powerful and his tyranny a success. Amasis would seem to have been an essential accessory to his *Machtergreifung*. And, as I said earlier (p.85), the actions Polykrates then started fit precisely into the strategic concept that can reasonably be attributed to the Saïte kings from Necho onwards (see Wallinga 1987: 60ff.). It is true that, if the covenant (ξεινίη: Hdt.III 39.2) between Amasis and Polykrates had this effect, this has been concealed rather than exposed in the traditions, but this can be explained as the result of the emphasis put upon the story of the ring. This is even more true of Polykrates' role of middleman in the hiring and transporting of mercenaries: hence the low opinion of the alliance on the part of most modern scholars. Still, it seems to me that such judgments put too much faith in traditions taken at face value. Not only is there too much evidence pointing in a different direction, but there is reason to assume that these traditions have been much debased by deception and propaganda, not to mention the fantasy of storytellers.

To begin with, it must be clear that, when Egypt had been conquered by Kambyses, Polykrates had a most urgent reason to play down the importance of the alliance, to minimize its scope and above all his own part in it, to conceal its purpose (which the allies will have avoided making public in the first place) and in general to suggest—e.g. by broadcasting the story about Amasis' breaking the bond and why—that the agreement came to very little. There is even more reason to distrust the other half of the tradition about Polykrates, which deals with his elimination by the Persian satrap Oroites. The fact that this man came to be considered a dangerous rival by Darius, and for that reason was liquidated in an equally perfidious manner as his later colleague

[57] This order is seldom respected in modern studies: the statement 'Polykrates stützte sich bei der Erringung der Tyrannis auf 100 Pentekonteren' (Dunst 1974: 159) is more outspoken than most, but not necessarily more incorrect. The idea that Polykrates' power was based on Samian capabilities alone is generally accepted. It certainly was the view of Eduard Meyer (see p.84). Still, when it is remembered (1) that Greek navies—in the sense of state-owned ships used for the purposes of the state—normally were very small in the archaic period; that (2) Corinth was quite exceptional in this respect (see p.28f.; cf. Wallinga 1987: 50-51); and (3) that very exceptional circumstances were needed to weld the merchant galleys of the Phokaians into a really dangerous navy, Polykrates' great power, especially his huge naval arm, is something that appears overnight from nowhere.

Tissaphernes[58], means that Herodotos' account of him (both as regards his motives for eliminating Polykrates, and his policies within his province and during what may be called the Persian civil war) is radically untrustworthy, being distorted by the propaganda of Darius and most probably also by that of Polykrates and by the fantasy of Herodotos' *logioi*[59]. If Oroites had special instructions to fight Polykrates, and if his effectives were reinforced, and his powers extended to this end, as I presume (Wallinga 1987: 60-1), this was of course not known to the Greeks. They made up for this lack of information by spinning specious tales (Hdt.III 126.2) about his conflict with his colleague in the neighbouring satrapy (which may be based on later fifth-century parallels[60]), and in particular about the elimination of Polykrates, where base personal motives are ascribed to him.

Because of this situation there is every reason to exploit the less questionable elements in the tradition and on that basis to conclude that Polykrates and Amasis had a very close alliance against the threatening Persians. Such an approach enables us to explain Polykrates' colossal navy and his territorial expansion as the result of their collaboration, and from this one may plausibly conclude that he really was set up by Amasis as his secret weapon against Persia. And just as plausible is the surmise that this close association also included the good offices of Polykrates in the supplying of mercenaries to Amasis. But even here there is more than plausibility: the tradition about the *samaina*, casually preserved by late sources, strongly suggests that this ship was used in precisely this context, that is to say that this tradition is unrecognized

---

[58] Hdt.III 127-8; cf.Xen.*HG.* III 4.25 and D.S.XIV 80.6-7 and for the end of Tissaphernes and the events leading up to it Westlake 1981: 257ff.

[59] In this perspective much of what has been written about the policy of Oroites by modern scholars is rather naive: see for instance Laura Boffo 1979: 85ff. and Balcer 1984: 138ff., 145ff. Balcer's notion that Oroites spurred rebellion against Darius in Sparda makes Darius' propaganda more successful than was claimed by its author! In my opinion we do not have a valid reason to make Oroites anything but a loyal Persian official, whose single-minded, if helpless, concentration on the Samian danger (combined, to be sure, with great military power) made him suspect in the eyes of the new king. Oroites may well have been more loyal to Cyrus and Kambyses (and perhaps other true Achaimenids) than to the usurper, but his behaviour implies no more than that he was fully occupied with the Samian threat even after Polykrates' liquidation.

[60] See Westlake 1981: 259ff. Rumours of quarrelling with neighbouring satraps may well have grown up around such a potentate as Pissouthnes, whose position vis-à-vis the Delian League will have been comparable with that of Oroites vis-à-vis Polykrates: see Lewis 1977: 80. The disagreement between the younger Cyrus and Tissaphernes could be another source of analogies. Of course the conflict between Oroites and Mitrobates may be historical, but the question is whether the Greeks knew more than the fact of the latter's execution.

evidence that can be combined with Herodotos' account of the continued service of mercenaries. To make this clear I must say something about the number of men involved and about the possibilities there were for their transportation in Polykrates' times. On the basis of a figure preserved by Herodotos an estimate can be made concerning the scope of the operation, admittedly very crude, but that is unavoidable. Also more can be said about their transportation than has so far been noted.

2.2 The transportation of the mercenaries

As far as I am aware no attempt at all has ever been made to study the mercenaries in this perspective. This is understandable, because Herodotos is practically silent about their transportation and because it is probably widely assumed that these men came as settlers, so that later there was no question of any *regular* transportation, as has indeed been argued by Austin. His argument is chiefly based on Herodotos' account of the two Greek and Karian settlements (II 154). He takes the words 'Psammetichos offered them χώρους ἐνοικῆσαι' to mean that he offered the mercenaries *grants of land* (to cultivate), in keeping with a long-established Egyptian practice. He describes the military function of these troops as follows: 'not ad hoc levies raised for immediate and limited military objectives' but 'needed ... both for ensuring the security and independence of the country ... and as a counterweight and supplement to the old ... class of the Warriors' (who also had been granted the right to settle and hold land). Finally, he assumes that the Greeks were treated like the Karians (for whom more evidence has been preserved), e.g. concerning their right to intermarry with native Egyptian women (Austin 1970: 18-9).

It can hardly be doubted that this argument contains a considerable part of the truth. Nevertheless the first point seems very difficult to accept. The words quoted are much better translated as 'assigned as abodes' (Rawlinson), for which cf. II 178.1: 'Amasis gave certain Greek traders plots of land upon which they might erect altars and temples'. For this reason I prefer to think that the mercenaries were not settled as a rule (certainly not in the beginning), but were enlisted for a limited time; that, being of farmer stock, they turned to 'gardening', as countrymen-soldiers will (see MacMullen 1983: 1f.), a propensity which may well have been pandered to by their employer in order to bind them more closely to himself; and finally, that a number of them did stay for a long period or forever, although as a rule the majority returned after their contract had expired. The resulting pattern must have been variegated and will have changed with time, several factors influencing the

attitudes of both employer and employees: growing familiarity leading to longer staying, diminishing demographic pressure and growing economic opportunities at home to the reverse. This reverse tendency must have been reinforced by the operations in the same labour market of the rival employer, the Lydian king, whose mere presence must have been enough to keep many of the men from specializing in the service of Egypt, not to mention the military obligations their home *poleis* might have had to that king as his subjects (see Hornblower 1982: 18 and n.102). I therefore conclude that there must have been a lively passenger traffic between Egypt and the Aegean and this conclusion finds confirmation in a detail of Herodotos' description of the *Stratopeda.* After Amasis had removed the troops to Memphis the emplacements were still recognizable by 'the slipways of their ships and by the ruins of their houses' (II 154.5). The construction of these slipways (*holkoi*) definitely suggests that (transport) galleys were at home in these *stratopeda*, i.e. that having brought a consignment of men the ships stayed there during the fighting season and then returned home with 'demobilized' men and with the first earnings (in kind) of those who had come with them, whether they themselves returned or not.

Although regular transport of mercenaries to and from Egypt may be plausible, the difficulty with the traditions in question concerns the kind of soldiers involved and their numbers, and especially the kind of development to be assumed in the long period between the first Psammetichos' beginnings and Amasis' dealings with Polykrates. When Herodotos asserts that the first freebooters coming to Egypt were 'bronze men' (II 152.4, cf.3), the inference that these 'soldiers can only have been hoplites' (Snodgrass 1967: 65) may seem obvious, but the question remains whether they were *all* 'hoplites' from the beginning, as also whether they always were 'hoplites' at the moment they started out from their homes in Ionia and Karia. The crucial period for the development of the hoplite phalanx—675-650: see Snodgrass 1980: 106—half coincides with the first generation of the collaboration of Aegean mercenaries with the Saïte dynasty. This collaboration (and that with the kings of Lydia) will therefore itself have been an important factor in the social and geographical spread of that development by providing marginal groups in the *poleis* with the means of buying armour[61]. For the mercenaries cannot all have come to Egypt as regular hoplites, analogous to the Athenian hoplites *ek katalogou*, from the beginning. It

---

[61] Failure to consider this factor in the hoplite evolution is the one serious omission in Singor's important monograph on this subject (1988).

seems very improbable that the average Greek '*zeugité*'-freeholder would have gone into foreign service, let alone abandoned his land to become a foreign settler in Egypt. Most mercenaries must have been of lower status. This raises the problem of their initial fitting-out and training, as it does in the cases of the Athenian thetes serving as heavy-armed marines and of the Spartan helots[62]. In the absence of any evidence the field open for speculation is wide: for myself I am inclined to assume that the initial organisation of the 'bronze men' as they came to Egypt—the crews of 'pirate' galleys (Hdt.II 152)—remained dominant, since transportation capacity was essential for the working of the mercenary system as a whole. This in any case implies that ship owners—the original 'bronze men'?—were involved and must make one think of organizations like the Athenian *naukrariai* (see p.17), which had the function of furnishing the *polis* with ships (surely *manned* ships!). Such organizations may well have developed private (and less regular) initiatives of their own and in such cases replaced regular (hoplite) crew members not willing to participate with volunteers, and equipped these men and (part of) the oarsmen with armour less complete than hoplites', but still such that they were superior to native (Egyptian) soldiers. Of course they completed their armour in case of success[63]. In that way many marginal citizens in the *poleis* of the sixth century could have become hoplite enough to serve in Egypt and in Lydia, and sufficient in number to explain the colossal figure in the Egyptian tradition.

If we assume, then, that these men served for shorter periods, e.g. for four years on an average[64], and that the number of Greek and Karian armed men in Egypt was in the order of 30,000[65] in periods of great

---

[62] Cf. Vidal-Naquet 1983: 139 and n.70; and Finley 1975: 167 and n.10 respectively.

[63] In Ptolemaic Egypt the mercenaries were armed by the king (see Will 1979: 172).

[64] Four years of course is a mere guess, but the complete silence of the tradition on the terms of service (not only concerning these early mercenaries: see Préaux 1978: 307) makes such guesses unavoidable. I repeat that I assume that the actual service done was very variable in duration. I note that mediaeval mercenaries had relatively short contracts (see Mallett 1974: 82f.).

[65] This is the figure mentioned by Herodotos in connection with the end of Apries (II 163.1): it is impossible to decide whether this was an exceptional number, or just the reverse, to Herodotos. It is perhaps more probable that Herodotos inserted an average figure into the record at a point where information on the strength of the mercenary army was desirable, than that an exceptional figure was preserved in a context in which it did not receive any special attention. In any case the political tension which came to a head in 525 must have led Amasis and his successor to the utmost exertion: I would not exclude that Herodotos' figure really belongs in that context. No doubt the figure is suspiciously 'round', but I would take it as the correct order of magnitude.

tension (such as the last 14 years of Amasis' reign), that would mean that each year up to 7500 replacements had to be supplied, i.e. a large number of shipments. The construction of the slipways shows that under the first Saïte kings these mercenaries were transported in galleys. It is true that on the route from the Aegean to Egypt the winds are favourable during the summer (and this circumstance was already well-known to the Greeks before the middle of the seventh century[66]), so that sailing ships might have been used, but the route back to the Aegean is very laborious for these ships (the winds now being contrary), not to mention the dangers of piracy threatening from the coasts they had to hug between Cyprus and the Aegean[67]. There is, moreover, reason to doubt—even for the sixth century—the use on such a long route of pure sailing ships, the evidence for which is late (see pp.2f. and 35ff.); and, as deserves to be emphasized, the development of the *samaina* is in itself an important indication that even by Polykrates' times there was as yet no question of regular traffic with sailing ships on this route. In view of all this it is no wonder that there still were vestiges of the regular use of galleys in connection with Psammetichos' *stratopeda* in Herodotos' time.

If, then, the 7500 mercenaries travelled to Egypt in galleys, one must allow for a great number of shipments: for a voyage of this length I would estimate the average passenger capacity of the galleys of the archaic age at not much more than 30 men[68]. There is no reason to assume that these ships differed much from those described by Homer with their 20 rowers, for which I would assume a length of some 18 to 22 metres (see p.50). It is a plausible hypothesis that the pentekontor Thukydides ascribes to the period of the Trojan war and describes as the prime naval vessel of the whole archaic period (I 14.1) was a ship of comparable dimensions with a second bank of oars added. And we

---

[66] For early visits of Greeks to Egypt see Braun 1983: 32ff. In the *Odyssey* Egypt is reached from Crete in five days: 'with a fine strong north wind ... It was easy sailing, as if downstream ... we sat on board while wind and steersmen carried us forward on our course; on the fifth day we came to the Nile's majestic waters' (XIV 253ff., transl. Shewring). The poet of the Odyssey was also aware of the difficulties of the return-journey (III 320-22: cf. West's comment).

[67] For the normal sailing course of a sailing ship between Egypt and the southern Aegean see Casson 1950: 43ff.

[68] Sailing ships no doubt could have carried many more men, although it would be rash to reckon them by the hundreds: ships with such capacity (see NT *Act.*XXVII 37 and J.*Vit.*XV) still were a thing of the future (though a relatively near future: see Th.VII 25.6). On oared vessels rowers had to have elbow room, so there cannot have been much space for what Thukydides calls περίνεως (I 10.4: I am here adopting what I hold to be Thukydides' reasoning concerning the sparseness of the non-rowing 'passengers' on Homer's transport galleys).

have seen that the Phokaians may have used such pentekontors to transport mercenaries to Tartessos, men who made these journeys at the oars as *auteretai*, like later mercenary-like soldiers mentioned by Thukydides (III 18.4; VI 91.4). But even if we put the number of men transported in one galley at 50 (most of them *auteretai*), the transportation of 7500 of them would still amount to 150 shipments a year.

In view of the very considerable organization needed both for the recruitment and for the transportation of this great number of men the hypothesis that a local agent was engaged by the Egyptians is in itself plausible and once this is assumed Polykrates more than qualifies for the job and after 546 is the first candidate to be considered. Since, moreover, the building of a new type of ship is ascribed to him, and this new type can be shown to have been particularly suited to the needs of the allies, but on the other hand not to those of Polykrates himself when acting on his own (i.e. raiding his fellow Greeks), this surely must be reckoned corroborative evidence. Consequently the character of the *samaina* is the decisive argument.

2.3 The *samaina* (Ill.25)

According to the Alexandrian scholar Lysimachos (s.III/II) the *samaina* was a *ploion dikroton*, that is to say a galley with two banks of oars[69], and had been constructed by Polykrates, the Samian tyrant (*FGrH* 382F7). Plutarch (*Per.*XXVI 4) adds that, because of certain features of the construction, it combined the qualities of a galley with those of a sailing ship: it could race under oar (ταχυναυτεῖν[70]) and travel over the high seas under sail (ποντοπορεῖν[71]), the latter thanks to its great width (it

---

[69] Dunst's rendering (1974: 159) '2 Ruderer auf jeder Bank' presupposes the *a zenzile* arrangement of the oars of ancient warships, an idea championed by Tarn, but rendered impossible by the Morrisons' reconstruction of the trireme (Morrison 1941 and Morrison, Coates 1986: Ill.45.

[70] Cf. Th.VI 34.5 where τὸ ταχυναυτοῦν—the galleys—is contrasted with the slower, i.e. sailing, ships of the Sicilian expedition. Dunst's explanation of ταχυναυτεῖν radically misjudges the term. He argues that the *samaina* 'imstande war, infolge der festen Lage im Wasser auch über die hohe See hinweg ihr Ziel anzusteuern, ποντοπορεῖν, während man sonst längs den Küsten unter vielen Umwegen sich vortastete. Es ist *dadurch* <my underscoring> auch das ταχυναυτεῖν ... erklärt' (1974: 160). The presumption that other (oared?) ships were obliged 'sich längs den Küsten vor zu tasten' is a (widely shared) prejudice which is confuted by Homer's descriptions of voyages 'über die hohe See hinweg' (*Od.*V 278: eighteen days!; *ib.*XIV 252ff.: five days).

[71] Plutarch thus uses the verb in *Dio* XXV. It clearly had this sense already for Homer (cf.*Od.*XI 11 and the synonym ποντοπορεύειν in V 77-78 and VII 267). Koraes replaced this perfectly sound reading by his own creation *φορτοφορεῖν, which was irresponsibly adopted by most nineteenth-century editors, and even by Ziegler (but not by Blass and Holden! see Holden's app.crit. and Stadter 1989: 251). Ironically

was κοιλότερα and γαστροειδῆς), the former for a reason concealed in the contrasting part of his description (here the text may be corrupt[72]), but easy to infer from the contrast itself which implies that the ship was (more) slender in its fore-part. Hesychios (s.v. Σαμιακὸς τρόπος) quotes Didymos for a characterization largely parallel to that of Plutarch (the *samaina* was broader in the belly; at the beak it was shaped in a peculiar way: here the text undoubtedly is corrupt[73]). Didymos prefaced his notice by a reference to something not mentioned elsewhere: the *samainai* were wholly decked over (κατέστρωντο δι' ὅλου). That is all the information we have.

Leaving aside the rather desperate problem of the form of the fore-part of the ship, which is not relevant in this context, I would explain these texts in the following way: the *samaina* was similar to the pentekontor[74] in that it was *dikrotos*, and comparable to specialized merchant galleys like the *eikosoros* (see *Od.*V 322 and p.41f.) in that it was wholly decked over. The combination of a complete deck and two banks of oars made the ship peculiar, since in the normal *dikrotos* ship the fixing of a deck on the beams, where the oarsmen of the zugian bank—the original oarsmen of the single-banked galley (see Gray 1974: G98)—were

Koraes' reasoning was along the right lines: he wrongly thought that a more explicit term than ποντοπορεῖν was needed.

[72] The Plutarchean mss. read ὑπόπρῳρος, which is emended to ὑόπρῳρος in all modern editions after Salmasius. Dunst's proposal (p.161) to take ὑπόπρῳρος in the sense of 'provided with a movable ("ausklappbar") ram' seems utterly fantastic to me.

[73] Hesychios' text says that the *samainai* 'τοὺς δὲ ἐμβόλους σεσήμονται (Dobrée changed this to σεσιμῶνται), ὡς δοκεῖν ῥύγχεσιν ὑῶν ὁμοίως κατεσκευάσθαι, οἷον ἰχθυπρώρους (ὑοπρῴρους: Salmasius) εἶναι'. Dunst, if I understand him rightly, is critical of these emendations, but does not make clear in what direction he would search for a solution (1974: 160-61). I do not believe that our information is sufficient to decide the matter. Salmasius presumably based his emendations of both Hesychios' ἰχθυπρώρους and Plutarch's ὑπόπρῳρος (see n.72)) on Choirilos' line 'νηῦς δέ τις ὠκύπορος Σαμίη, ὑὸς εἶδος ἔχουσα (F6), but the different corruptions of what is supposed to be one word make one doubt and what is said by the three authors is not precisely parallel: Choirilos compares the ship itself with a boar; Plutarch qualifies the ship's σίμωμα, whatever it may be (not identical in my view with the ram), as ὑπόπρῳρος; and Didymos comments on the shape of the ram. I do not think that the pig's head shape of the ram as we see it in vase-pictures (see Stadter 1989: 250)—not necessarily Samian!—is what Plutarch can mean: his ship's capacity for ταχυναυτεῖν depended on the σίμωμα's shape. It must have comprised more than the ram alone.

[74] There is no evidence that the *samaina* actually had an oar capacity of fifty (which is what *pentekontoros* means, *not* that such a ship was always rowed by so many men! Cf. p.174 on the analogous case of the trireme). However, as *dikrotos* oarage of such capacity could be mounted on what I hold to be the normal twenty-oared galleys of the archaic age, including the *eikosoros*, this hypothesis involves the minimum of assumptions, viz. that two alterations were made, the addition of the deck and the second bank of oars, no more.

seated, was incompatible with this bank (and a fortiori with the thalamian class of oarsmen, who could not do their work in the closed *thalamos*). The combination at least required that the shipwright brought the deck down sufficiently to give the zugian oarsmen room for their legs, i.e. to place them on benches like those of the thranites or, alternatively, to seat them on chests as in the ships of the Vikings.

It is obvious that a galley of this sort cannot be a warship, although it seems to be taken as such by Dunst ('<k>ein gemeines Lastschiff'!) and certainly is by Shipley (1974: 160 and 1987: 81 respectively; their view is probably shared by many others). The decisive argument against it is the fact that, since the *samaina* was especially built for Polykrates, its wide belly was part of the design and this feature put it at a considerable disadvantage in comparison with the normal[75] warship of those times, the pentekontor[76], which Polykrates certainly would have used if the ships had had to serve in his piratical undertakings. Significantly the holders of the view just rejected have no explanation for the wide belly, which without doubt made the ship a merchant galley. It certainly was taken as such by Plutarch and his source. Merchant galleys, as I have demonstrated (see p.92), were more suited than sailing ships to the meteorological conditions prevailing on the route between the Aegean and Egypt, especially the voyage from Egypt to, among others, Samos. On the other hand the average galley of Polykrates' times was not the obvious instrument of trade with a country that chiefly exported grain, because it was an open ship. This must be the reason why the *samaina* was wholly decked over; the same is of course true of its wide belly. I would indeed venture the speculation that, once trade with Egypt had become regular, merchant galleys furnished with complete decks and wider than average beam—such as I assume Homer's *eikosoros* to have been—will have become the prevalent type of ship in this traffic. The *samaina* would seem to be a further step in this development.

If, therefore, the *samaina* conformed to these specifications, that still did not make the ship exceptional. Moreover, it is very improbable that it would have been remembered as the invention of a specific period or person if that was all there was to it (and it should be noted that the type

---

[75] By 'normal' I mean that every naval ship built in the sixth century for the *polis* (to be used *inter alia* as a warship, but never exclusively as such) was a pentekontor, *not* that every pentekontor then was a warship. The Phokaian pentekontors evidently were merchantmen.

[76] The greater seaworthiness that may have been the result of its greater beam (witness Plutarch's ποντοπορεῖν) can hardly have been more than an accidental quality. The Phokaians demonstrated the seaworthiness of the pentekontor sufficiently.

does not figure in any conspicuous episode in relation to Polykrates![77]). What really distinguished the *samaina* from other galleys of the same general type must therefore be its two banks of oars and it is this feature that must be explained.

Now it seems improbable that these banks were added because of the needs of the grain shipment. Grain is not such a perishable cargo that some weeks of travel make a great difference, provided dry stowage is guaranteed. In later times grain shipments from Egypt to Rome took seventy days on average (Luc.*Nav.*IX): that ought to have been realizable for any ship bound for Samos from Egypt. Added oarage, moreover, probably would make the cost of transport prohibitive for grain. In this perspective the cargo for which the oarage was increased must have been much more precious and such a cargo is of course to be found in the mercenaries Egypt imported, by the thousands per year if my calculation is approximately right. I have already suggested that oared ships were the obvious means of transport for such men. A galley fit for both grain and troop transport was thus ideally suited as an instrument in the collaboration between Amasis and Polykrates. If, on the other hand, Polykrates' power had been based on Samian capabilities alone, his own piracy and the trade of his subjects, there is no explanation for the *samaina*.

2.4 Implications of the *samaina*

If the *samaina* is correctly assessed in this way, the nature of this ship, and the fact that it was built for Polykrates, taken together make an

[77] It has been suggested that the effigies of the coinage of Samian exiles in Zankle represent the *samaina* (see Dunst 1974: 161, cf. Robinson 1946: no.47), but there is no evidence that these men travelled there in *samainai*, nor that the type was still in use a generation after the special relationship between Polykrates and Egypt had come to an end. The close connection between ship and tyrant in our late testimonies suggests that the type did not survive its designer for long. The fact that the term *samaina* also was used for a Samian coin (Photios *s.v.* Σαμίων ὁ δῆμος) and perhaps for the seal of the *polis* Samos (Plu.*Per.* XXVI 4), both presumably with a ship as effigies, will indeed signify that the Samian ships represented had a distinctive build: this is said in so many words by Herodotos when he relates the sad end of the exiled Samians at Kydonia: 'The <Aiginetans> sawed off the boar-shaped prows of their ships' (Hdt. III 59.3). Here again there is no reason to consider these ships to have been *samainai*, as Jeffery asserts (1976: 217), on the contrary: the Samian exiles had been sent to Egypt in Polykrates' triremes, had beaten (the rest of) his navy when they returned, but had failed to press their advantage on land, after which they started the wandering that finally brought them to Kydonia (Hdt.III 45ff.). Their ships surely were triremes: that precisely was what made them such difficult opponents that it took the Aiginetans—who did not have triremes at that time (Th.I 14.3)—five years to prepare their attack (Hdt.III 59.3).

important statement concerning the policy and the actions in which it had to serve. In the times of Amasis' predecessors—for which there is (apart from Gyges' assistance to Psammetichos I) no trace of direct military collaboration between Egypt and Lydia (and whoever else may have been Egypt's middleman in the hiring of mercenaries)—the difference in travelling time between the voyages out and back will have been acceptable. Time-expired men probably were in no particular hurry: as a rule there will have been no emergencies demanding their quick return and the normal merchant galley (and even the *eikosoros*) was fast enough for that reason. That an entirely new type of merchant galley was built, combining the oarpower of the pentekontor with the cargo capacity of the *eikosoros*, makes sense only on the assumption that the transportation of troops *from* Egypt *to* the Aegean had wholly changed in character and had become a matter of great urgency. Again there is no direct evidence that this happened, but once the view of Amasis' policy of the period after 539, expounded above, is accepted, the assumption is unavoidable[78]: it was greatly in the interest of Polykrates that troops could be quickly moved from Egypt to Samos in case he came under pressure, and even if the Egyptian navy could have performed that task, it was in Polykrates' interest not to be entirely dependent in this respect on the Egyptians, who might have other priorities at the critical moment.

If this was the function of the *samaina*, one would expect the ship to have been built in considerable numbers: one or two, or even ten, would not have counted strategically. That is why it is very tempting to combine the tradition concerning the *samaina* with Herodotos' testimony that Polykrates—after allying himself with Amasis—obtained a hundred pentekontors. These two types of ship will have been rather similar: apart from the deck only their width need have been different. The pentekontor at any rate must not be considered a uniform type, such as the trireme almost certainly was; it is reasonable to assume that merchant pentekontors such as those used by the Phokaians were somewhat different (no doubt mainly in width) from the pentekontors built for *polis* navies. If the *samaina*'s *dikrotos* oarage was similar to that of the pentekontor, the *samaina* may be considered a specialized pentekontor

---

[78] The fact that Egyptian troops were moved to Lydia in 546 (see Xen.*HG* III 1.7; *Cyr.*VIII 1.32-45: cf. Sekunda 1985: 19) proves that the alliance between Amasis and Croesus had the same strategic objectives. On the possibility that these troops were Aegean mercenaries in Egypt's service see Hornblower 1982: 18 and n.101. I fail to see why descendants of Ionian and Karian mercenaries would have been called Egyptians more than a century later.

and the identity of Herodotos' 100 pentekontors with *samainai* very plausible indeed. And one hundred of these ships certainly carried great weight strategically.

This figure of one hundred is interesting for another reason. Phokaia, the *polis* Thukydides mentions in one breath with Polykrates as an important sea-power (I 13.6), probably possessed some 120 pentekontors at the moment it was attacked by the Persians (see p.73 n.28). As I demonstrated, a presentable case can be made for these ships being used to transport mercenaries to Tartessos. That is to say that the two powers resembled each other to a very high degree: both depended for their naval strength on the economic potential of a non-Greek country and both repaid what they owed to their partners in military services.

In this connection it is an interesting question whether there were more participants in this traffic in mercenaries. In my view this is not very probable for the western branch[79], but Egypt is a different matter. It is not entirely fanciful, for instance, to suppose that the Phokaians who returned from their exodus to Phokaia did so in the expectation that they could concentrate on Egypt in the future. However that may be, there are certainly more obvious candidates. In the tradition concerning Naukratis Aigina and Miletos are treated as the equals of Samos, these three *poleis* evidently being predominant in this port-of-trade. They are bound together not only by their having their own temples, but even more intimately by the hostility of two of them—Aigina and Miletos (with Mytilene added: Hdt.III 39.4 and 59)—towards the third. This hostility manifested itself during Polykrates' reign and would be readily explicable if Polykrates tried (or if he and Amasis had agreed) to exclude the others. It is true that Herodotos' informants explained the hostilities they related as stages in hereditary enmities and they are generally taken seriously even now (see Figueira 1982: 207f. and Shipley 1987: 37-38), but one may legitimately ask if such explanations could not just as well have been made up by amateur historians among these *logioi*. In the circumstances of Herodotos' *historia* the factors actually leading to such conflicts were no longer obvious[80] and 'traditions' like those concerning the ancient Samian king Amphikrates and the participants in the Lelantine war (Hdt.III 59; V 99) probably common as grass. To assume that the conflicts in question had to do with a real bone of contention seems more rational than the uncritical acceptance of ancient (?) tales.

---

[79] No competitors are mentioned in the tradition; Herodotos' account suggests that the Phokaians monopolized the trade with Tartessos.

[80] If only because there were no Greek mercenaries serving in Egypt in the middle of the fifth century.

That an almost mythical *casus belli* was attached to the attack on Kydonia indicates that the privateering of the Kydonians was not the only reason for this operation: clearly the wrongdoers were identified with a policy that was felt to be Samian, if not indeed specifically Polykratean.

2.5 The end of the alliance

On the hypothesis here defended (and also in consideration of the fact that the traditions have been affected by propaganda and deceit: see p.87f.) it is difficult to believe that the alliance between Polykrates and Amasis ended in the way Herodotos heard it, even if we ascribe a more serious—or at any rate more political—motive to Amasis. As long as the *parathalassioi* of the Levant remained loyal to the Persians, the Egyptian king simply had no choice but to cling to his Aegean 'friends', even if he did not always like their initiatives. That Polykrates raided his Aegean neighbours can hardly have been to the taste of Amasis, whose diplomacy like Necho's was aimed at winning the Greeks. He may well have remonstrated, perhaps with success! (witness the anecdote about Polykrates' restitutions: Hdt.III 39.4). No doubt the allies were in regular communication, but the tradition that an Egyptian envoy came to denounce the treaty (Hdt.III 43.2) is not therefore to be taken on trust: even if the envoy's message—a note of protest?—was public (as Herodotos suggests by making him a herald), Polykrates had reason and opportunity enough to spread his own highly coloured version (if it is not indeed wholly a falsification!) after his ally had been conquered by the Persians.

With respect to the story of Polykrates' attempted support of Kambyses in 525 (Hdt.III 44) scepticism is even more justified. Whatever instructions he may have given to the commander of his 40 triremes, after the Egyptian defeat he had no choice but to maintain that he had ordered him to support the Persians. The rest of the account preserved by Herodotos seems to reflect the viewpoint of the rebels exclusively, but is not incompatible with the view that Polykrates' instructions were entirely opportunistic[81] and that his squadron, unable to help the Egyptians and not needed by Kambyses, was sent back by the latter with orders to make away with Polykrates. But it is equally possible that Herodotos' first version of the return is right and that the officers and the marines[82] refused to proceed because they did not like the double

---

[81] In my view that would not exclude the possibility that Polykrates sent an envoy to Kambyses with an offer of support (Hdt.III 44).

[82] Though not necessarily chosen for that reason, as Herodotus' informants—the grandsons?—averred, these men are in fact not unlikely to have belonged for the

dealing of the tyrant and feared the wrath of the victorious king, whoever he would be, if the secret leaked out.

2.6 The basis of Polykrates' power

When Herodotos begins his account of the drama of Polykrates' end, he characterizes him as 'the first Greek known to us who planned to have the mastery of the sea (*thalassokratein*)' and 'who entertained every hope to rule Ionia and the islands' (III 122.2).

It is important to note that this is not said when Polykrates' great power is defined (III 39.3), but in the context of the Persian satrap Oroites' attempt to put him out of the way. Presumably, therefore, he was assumed to have nursed his thalassocratic ambitions right to the end of his life, that is to say even after the ruin of Saïte Egypt. Certainly it looks as if, at the moment that Oroites sent his envoy to lure him to Magnesia, Polykrates was still much too powerful for the satrap to have any other means of destroying him. As I have endeavoured to demonstrate, this is more than likely to be correct. If on the other hand my analysis of the relationship between Amasis and Polykrates is valid, Polykrates for his part must have been in great difficulties at that moment, because he was unable to use his naval power for an extended period without regular revenues, i.e. the Egyptian subsidies.

Now it is a most interesting fact that such difficulties are mentioned in the tradition: lack of money was precisely the weakness in his adversary's armour at which Oroites' attack was directed. The gist of his message to Polykrates was as follows: 'You have great designs, but not the required money: if you let me help you out, you will also save me', and Herodotos expressly gives us to understand that this worked like a spell 'for Polykrates indeed greatly craved for money' (III 123.1). In thus presenting the tradition Herodotos, moreover, suggests that Oroites' message had been delivered in public, and this in my view is very plausible: there is no reason why it should have been secret. The message will therefore be genuine, particularly as it seems most improbable—given Polykrates' reputation of *megaloprepeia*, put on record in precisely this context (III 125.2)—that the negative evaluation the message implies was the result of posthumous interpretation by Greek *logioi*. Oroites' message in other words fully corroborates the hypothesis concerning the basis of Polykrates' power I have been expounding in these pages: the promptness with which the adressee fell for it provides the clinching argument.

---

most part to (potentially) anti-Polykratean factions.

The hypothesis here proposed puts a rather different face on the career of Polykrates of Samos and makes the man more of a pawn on a chess-board where mightier pieces dominated the game. This may rob him of some glory, but makes him more understandable and the scale of his power and his operations more acceptable: if we had to take the tradition in the sense that all this was based on Samos alone, his power would be entirely out of proportion. Polykrates' naval forces being halfway comparable to those of the Delian league, one would have to suppose a comparable infrastructure too, and that, without any corroborative evidence, would be irresponsible.

3 *Conclusion*

If my hypothesis concerning the navies of Phokaia and Polykrates is valid, the conclusion of the second chapter is much reinforced: the scale of Greek naval power appears to have been much smaller than has almost always been taken for granted; the sea-powers of Phokaia and Polykrates, which seem to disprove that conclusion, are shown up as having a non-Greek basis. In this perspective Thukydides' exposé of the small-scale naval developments in Greece before Darius' death, which has often been treated as quantité négligeable[83], is confirmed. It is now evident, moreover, that the chief cause of modern misunderstanding, Thukydides' emphatic referral to the trireme in the context of the Corinthian naval lead, must be due to his informants who thus projected the fifth-century scaling-up of the Greek naval ships backwards into early archaic times.

It is also evident that the transition to the predominance of the state-owned triremes, Thukydides' 'modern style' of naval power, was a veritable revolution which involved far more than the triremes alone. Here we must think of much enlarged public funds; the fiscal institutions ensuring regular collection; new officers of the state to command, and above all to take the responsibility during actions for the maintenance of, the ships (a charge for the most part outside the competence of the state authorities in the old system, because the *naukraroi* commanded and maintained their own ships); state-owned naval yards and/or harbours. This was in itself a revolution, but the term is doubly appropriate, because something was introduced in the sphere of the *poleis* that was out of proportion to the majority of them, and that they would not have adopted themselves without an acute outside threat. This

[83] Mostly without explicit refutation: here the outstanding example is Hammond's treatment of the navies of Aigina and Thasos (1988: 504).

revolution must have caused something like a crisis in all but the wealthiest of them. The reason that this does not come out in the tradition must be that the shock was absorbed by the great commotion of Xerxes' invasion. But this ought not to blind us to the magnitude of the change.

CHAPTER FIVE

THE INVENTION OF THE TRIREME AND THE CREATION OF THE PERSIAN NAVY

1 *The invention of the trireme*

At the date of the battle of Alalia there were, as we have seen, certainly no triremes in the West, nor probably in the East. If the type had been in existence anywhere in the Mediterranean world, the Carthaginians at any rate would have heard of it and could not have failed to use it against the superior pentekontors of the Phokaians. That it was unknown in the Greek world at the time is Davison's convincing inference (1947: 20) from the tradition that Polykrates of Samos after his coup d'état of *c.*540 acquired 100 pentekontors (Hdt.III 39.3) and only afterwards, just before 525, triremes. Davison also argued (p.21f.) that Thukydides' evidence, like Herodotos', 'strongly suggests that the trireme first began to supersede the pentekontor <in *Greek* navies> in the latter part of the sixth century, and that Ionia was the scene of this revolution'. In my second chapter I have endorsed this view in so far as Thukydides' Greek navies are concerned[1].

The earliest literary testimony for the existence of the trireme is Hipponax' squib at the painter Mimnes, who had painted a snake on the side of a trireme (fr.28 West), a passage which can be roughly dated to the second half, or the last third, of the sixth century[2]. Next in time are referrals by Herodotos to triremes in the sphere of Saïte Egypt and its allies: first those built by Necho (Nekos: II 159.1); then a much later one, sent by Amasis to hunt out the mercenary captain Phanes (III 4.2); and finally Polykrates' forty, which were sent to Egypt as an auxiliary

[1] Davison no doubt saw the Samian pentekontors as 'warships' and did not associate them with the *samaina*, as I do (p.97). But this nuance leaves his argument untouched: the *samaina* may have been somewhat slower than the state-owned pentekontor, but retained a good deal of its 'warship' potential.

[2] There are three ancient testimonies concerning Hipponax' epoch: the Marmor Parium associates it with the reign of Cyrus (*FGH* 239 F 42: ἀφ' οὗ ὁ Περσῶν βασιλεὺς Σάρδεις ἔλαβεν ... [... ἦν δὲ] καὶ Ἱππῶναξ κατὰ τοῦτον ὁ ἰαμβοποιός); Pliny with the 60th Olympiad (540-536: *Nat.* XXXVI 11: <Hipponax poeta> quem certum est LX olympiade fuisse); Proklos dates his ἀκμή to the reign of Darius (*Chrest.* XXXI: Ἱππῶναξ δὲ κατὰ Δαρεῖον ἤκμαζεν). This suggests that the two decades 540-520 were the period of Hipponax' greatest activity and that any of these years is a possible date for the poem in question.

squadron in Kambyses' expedition (III 44.2,). Moreover, from the way Herodotos implies as a matter of course that the ships in Kambyses' expedition were triremes[3] and nowhere so much as hints at the use of other (older) types as line-of-battle ships in the Persian navy, I conclude that for Herodotos and his informants Kambyses' naval armament wholly consisted of triremes. In 525, accordingly, the existence of the trireme is manifest. Therefore the ten to fifteen years between Alalia and Kambyses' Egyptian expedition are the obvious period for the trireme's invention: in Davison's methodically rigorous formulation 'the first introduction of the trireme into Greek navies' (1947: 24) should be dated to that epoch. The problem remains then of Herodotos' attribution of triremes to Necho, which has been used by several scholars[4] to date the creation of the type to the seventh century and even earlier.

To begin with I must repeat that *if* the trireme had been in existence since before 600, it would be very strange that in the years before Alalia the Carthaginians did not avail themselves of this obvious answer to the Phokaian threat and even stranger that Polykrates, who obtained his navy after he became Egypt's ally (see p.87), did not use them from the beginning. These two difficulties alone justify a very sceptical attitude concerning this anomalous piece of information.

Moreover, the provenance of the testimony must give one pause. In Egyptian the term for trireme was *kbnt*-ship[5]. This word was not of the same specific semantic value as the Greek τριήρης, which is used by Herodotos: it was a generic term for 'sea-going vessel', signifying '"Byblos ship", so called after the port of Gublu (or Byblos) at the foot of the Lebanon'[6]. *Kbnt*-ship in other words was more or less equivalent to Greek *naus*. In the Ptolemaïc period it was employed for the war galleys used then, i.e. classes like the πεντήρης (see Lloyd 1972: 274f.). This warrants the assumption that it was equivalent to τριήρης in Herodotos' times when this class dominated the naval scene and squadrons of triremes manned by Egyptians were part of the Persian navy (see e.g. Hdt.VII 89.2). However, prior to the creation of the trireme it could by the same token have been used for pentekontor, or any other type of sea-

---

[3] The Mytilenaian crew lynched by the Memphite mob (Hdt.III 13.1 and 14.4-5) is put at 200 men without comment.

[4] Basch 1969: 232; 1987: 334; *SSAW* 81 n.19; *GOS* 129 and 158; Morrison, Coates 1986: 38-40. Cf. Gray 1974: G75.

[5] Cf. Lloyd 1972: 276ff. The word is also transcribed as *kbnwt*-ship: Drower 1973: 348.

[6] Gardiner 1961: 36. 'It is not certain whether the word *kbnt* first denoted a ship built in Byblos, a ship built of Byblos timber, or merely a sea-going vessel used on the Byblos run' (Drower 1973: 348).

going ship, as indeed it was at the time of the Eighteenth Dynasty (see Hayes 1973: 368). Therefore, when Herodotos gathered his information on Necho's naval arm, *kbnt*-ship will have been translated τριήρης by his Greek-speaking informants regardless of its true significance in Necho's times. There is no reason whatever to assume that these informants used the term in a precise, historically justified, sense.

It is even possible that Herodotos had another, just as dubious, reason to call Necho's ships triremes. As I shall argue presently, Necho's galleys were probably bigger, and in particular longer, than the pentekontors used in the contemporaneous Greek navies, even if they were not triremes. For this reason it is natural to suppose that constructions in naval yards were also bigger than their counterparts in the Greek *poleis*. When therefore Herodotos was shown the slips Necho had built for his ships (II 159.1), their dimensions may have caused him to conclude that Necho's ships were triremes without any help from Greek or Egyptian informants: any Greek of the fifth century would have done the same[7].

There is in other words reason enough to mistrust Herodotos' testimony concerning Necho's 'triremes', even more reason than what has just been mentioned, for the real difficulty is that there is no intelligible context for their invention or introduction in the Saïte navy: no comparable naval power is recorded in the neighbourhood. I shall therefore ignore this anomalous datum for the moment and come back to it at the end of this chapter. In the Graeco-Phoenician context the ten to fifteen years after Alalia must remain the crucial period for the trireme's invention (or introduction). As Davison saw (1947: 23), this conclusion is not refuted by any part of the non-Herodotean evidence, in particular the evidence collected by Thukydides (I 13.6-14.2). Thukydides inevitably dated the introduction of the trireme into Greek navies to the second of the three stages into which he divided the history of naval developments in Greece, but not more precisely within that stage, a period of well over two centuries (between the end of the eighth century and the death of Darius I in 486). Hence a date around 500 is perfectly consistent with his account. Indeed the way in which he connects the final breakthrough of the type with Darius' death, i.e. with the years after 490, strongly suggests that he (rightly) considered Polykrates' triremes as not strictly Greek and for that reason not representative for the development of *Greek* sea-power.

---

[7] Since, as I shall argue, the trireme (though not its oarage) probably was an Egyptian (Saïte) 'invention', recollection of this event may also have led to the ascription of triremes to Necho.

Implicit in Thukydides' exposé is another feature of the evidence, one of which he will have been conscious but which has attracted very little attention. This is (as I noted p.66f.) that there were so very few purely Greek sea-powers of note during his second stage, such sea-powers in other words as could be expected to adopt the trireme as soon as the type had been invented. Thukydides expressly excludes Athens and Aigina even for the beginning of the third stage (the first years after Darius' death: I 14.3); he passes over Lesbos and Naxos in silence, though both are mentioned in a naval context by Herodotos (III 39.4; V 30.4), and also the Euboian cities, though Eretria already possessed triremes in 499 (Hdt. V 99.1). Since, as I demonstrated in the fourth chapter, two of the three big sea-powers he does mention—Corinth, Samos and Phokaia—owed their naval greatness to factors outside the Greek sphere, Corinth was the only purely Greek sea-power of any significance in the archaic period, so far as Thukydides had been able to ascertain. And even this prosperous *polis* remained of modest means when compared with Thukydides' own Athens. In 435/4 it could indeed muster no more than 30 triremes (Th.I 27.2), in 480 it had contributed 40 (Hdt.VIII 1.1) and a short time before that it had had the disposal of probably more than 40 ships, but then chiefly pentekontors (Hdt. VI 89, see p.23). Only as far as its *organization* was concerned this early sea-power deserved Thukydides' characterization 'very nearly modern', its naval forces consisting for the most part of state-owned ships. It is a striking fact that Thukydides nowhere so much as suggests that it was in any way backward as compared with the navies of Polykrates and Phokaia. Moreover, he clearly gives to understand that Corinth's nearly modern organization reached back to the eighth century.

Now the problem is whether, as is the view of Morrison[8], Basch (lastly 1987: 331ff.), Lloyd[9] and older students of the trireme[10], sea-powers of this kind are likely to have developed this type. The trireme was very much bigger than the pentekontor: in length it measured some 35 m as against the pentekontor's *c.*23m (see p.49f.) and it required up to 170[11] oarsmen in three instead of in two banks, hence was far

---

8 To mention the principal publications only: *GOS* 158f.; 1986: 38ff.

9 E.g. 1972: 276ff.; 1988: 159f.

10 E.g. Assmann 1888: 1638; Torr 1895: 4; Köster 1923: 105.

11 Athenian triremes had 170 oars (*GOS* 289f.) and so could be rowed by 170 rowers; in practice, however, triremes were often undermanned (see Appendix). In theory triremes of other *poleis* could have had fewer oars, and so could the earliest ones (see e.g. Ed. Meyer 1939: 338 n.1), the later Athenian version being the culmination of the development. I do not consider this very probable, as there is no trace of any variation in the sources, nor is it to be expected, if the *poleis* borrowed the trireme from the eastern kingdoms: this ought to have made for

more costly, especially in exploitation. What had such a ship to offer to them? Was it the bigger space it offered, or the greater oar-power? And why was this needed?

In modern discussions of the invention/introduction of the trireme this problem has not been posed in this way, because it was assumed that the trireme was the further development of a Greek *monokrotos* (or *dikrotos*) predecessor with the same dimensions[12]. This further development was supposed to have occurred because ramming-tactics required ever more oar-power, and this no doubt is true in a sense. But because ramming-tactics were a late innovation (see p.73f.) and, even when developed, were by no means universally adopted (see p.24f.); and because the long pentekontor is to be removed from the Greek naval record altogether (see p.46-52), the problem must be tackled as just stated: since the development from pentekontor to trireme involved a *double* scaling up, was it the greater capacity, result of the greater length, or the greater oar-power that was the aim of the inventor?

In the Greek context the problem solves itself. At Alalia the Phokaians had demonstrated that the pentekontor was an adequate instrument for sophisticated naval tactics. Moreover, in the five years they needed to find an answer to the threat of the Phokaians their opponents were unable to train their crews to the point that their ships of the line were comparable in quality—unit by unit—to the Phokaian ships, and had to try their luck with a large numerical majority. This is eloquent testimony that, for *poleis,* the cost of regular training of the oar crews was far more problematical than the building of more, and probably also of bigger, ships[13]. In the bigger ship, moreover, a very considerable part of its extra oar-power was needed to give it the same speed as the smaller pentekontor: if triremes were faster than pentekontors on the average *in practice* (which is far from certain!), the gain in speed was bought at a very high cost with the ample trebling—50 to 170!—of the oar capacity. In the world of the *polis* the spontaneous adoption of the trireme for its greater speed is therefore not to be expected. Accordingly

---

uniformity. The borrowing was in other words wholesale, just as the Samians had wanted to possess the Corinthian type of pentekontor and had borrowed the Corinthian builder to make certain they got it (see p.23). In any case, such assertions as Hammond's, that 'The Phoenicians had built somewhat larger triremes than the Chians, for instance, for they had a crew of 200 and 40 marines, whereas Chian triremes had a crew of 150 and 40 marines <at Lade>' (1988: 504), have no basis whatever.

[12] E.g. Köster 1923: 105; Meijer 1986: 36-37.

[13] This must be one of the reasons why Athens had so many more ships at the beginning of the Peloponnesian war than ever came into action at once: as soon as expensive crews were hired, it was imperative to have sufficient reserves available.

it is understandable that, when the trireme became the line-of-battle ship in *polis* navies, the ships were very often undermanned (see Appendix).

What then of greater dimensions? Greater dimensions meant greater transport capacity[14]. In the traditions concerning the trireme, transport capacity is indeed a very important attribute of the type, fully as important as its fighting qualities: a trireme was either 'fast' (for fighting) or 'for soldiers', i.e. for transporting troops (see p.177). Here again the case is clear: *if* transport capacity was the crucial factor in the genesis of the trireme, the notion that this type of ship originated in Greece—or more generally in the world of the *polis*, Phoenicia included—loses all credibility. The undertaking of large-scale seaborne operations such as would require these big transports has never been imputed to these small states and for obvious reasons. The attack by sea on Naxos that was undertaken in 500 by the Persians with a fleet of triremes is implicitly but unmistakably characterized in Herodotos' account of it as entirely beyond the capacity of Miletos (V 30.4-5)[15]. The trireme as a transport vessel is therefore to be considered as typically belonging to the navies of big powers (as imperial Athens for instance), for which large-scale seaborne operations were practicable.

In the period before 525 such big powers were only to be found in the East and if the situation in the years 540-525 is seen in this perspective, Egypt is the first power to think of. Egypt had been a sea-power since the reign of Necho (Hdt.II 158). Because the power confronting Necho and his first successors—the New Babylonian kingdom—never became a sea-power, it is natural to assume that the fighting capacities of their ships were not the first requirement of the Saïte kings, but that their transport capacity was. Their naval strategy led indeed to operations in which their navy transported troops and supplies to points on the Syrian coast (see p.85f.) and under Amasis conquered and held Cyprus (Hdt.II

---

[14] Van Doorninck holds that the greater momentum of the trireme was an important factor in its first design. I would not deny that this was appreciated once the trireme was adopted and that it then led to the virtual disappearance of the pentekontor as line-of-battle ship. Still, momentum would depend in part on the degree of manning (and also on the quality of the crews), and when it is considered that fully manning a fleet of triremes must have seemed impossible to achieve to *polis* authorities accustomed to pentekontors, this factor in my view could not have been more than a very secondary consideration (and certainly not an important primary motive) for developing the type.

[15] There is not even a hint in this account that Miletos would have been capable of the type of support given by Peisistratos to Lygdamis and by Lygdamis to Polykrates (Hdt.I 64.2 and Polyaen.I 23). This suggests that the Naxian strength at sea, which is hinted at by Herodotos (V 30.4), made such support as was within the capacity of any *polis*, even Miletos, totally insufficient.

182.2: there is no question of naval resistance by the Cyprians). For such purposes these kings needed big ships even before the trireme was available.

Unfortunately direct evidence for such ships has not been preserved: Lloyd at any rate writes as if no Egyptian alternatives were available for the Greek-type trireme-size galleys he ascribes to Necho and his successors[16]. But just as the *poleis* are not the place where to expect such big ships, Egypt *is*. Very large, and no doubt stoutly-built, barges were used early in the second millennium to transport obelisks downstream from the quarries at Aswan, vessels that must have been well over 60m long and 21m wide (*SSAW* 17). Of course these were river-craft, but as the Egyptian sea-going ships of the earlier period resembled the river-craft, a continuing resemblance in construction and size is not to be excluded[17]. In this connection Hellenistic evidence is relevant and instructive.

A large type of merchant galley, the *kerkouros* (κέρκουρος[18]), is especially associated with Ptolemaic Egypt. The *kerkouros* is revealed by papyri to have been 'during the last three pre-Christian centuries the standard large carrier of grain on the Nile' (*SSAW* 163-4). One document (*PTeb.*856) gives a list of *kerkouroi* mobilized in *c.*171 BC to transport the annual grain revenues from Ptolemaïs to Alexandria. The carrying capacity of these ships ranged from *c.* 225 tons to as much as 450 tons. It has been plausibly calculated that the biggest *kerkouroi* measured up to 50m long, that is to say even longer than a trireme's 35 metres (*SSAW* 164 n.40). Although there is, as far as I am aware, no evidence that Nile *kerkouroi* also put out to sea, big *kerkouroi* could be seen in

---

[16] See Lloyd: 'This passage <Hdt.II 159.1> creates the strong impression that the Saïtes were getting assistance from the Greeks in naval matters ...' (1972: 268). As Herodotos here does not breathe a word about the Greeks, the 'strong impression' is only created by bringing in a modern prejudice.

[17] See *SSAW* 20f. It is interesting to note that mediaeval Egyptian rivercraft were also found at sea (Goitein 1967: 295).

[18] For this word see Frisk *s.v.*: 'ein leichtes, ursprünglich kyprisches <Plin. *Nat.*VII 208> Fahrzeug (Hdt.hell.), auch N. eines Meerfisches. Eig. als Bahuvrihi "mit einem κέρκος-ähnlichen Hinterteil" sofern nicht volksetym. Zurechtlegung eines Fremdw.; semitische Hypothese von Movers bei Lewy <*Die semitischen Fremdwörter im Griechischen*, Berlin 1895> 152; dazu Chantraîne, Étr<ennes> Benveniste 13f.'. In the same sense Chantraîne *s.v.*, sharpened to '... hypothèse sémitique peu fondée chez Lewy 152'. The Semitic origin is accepted by Torr ('perhaps an adaptation of the Phoenician word which appears in Hebrew as *kirkârâh*'; Torr does not depend on Lewy) and Casson (*SSAW* 163 and n.37 'Greek rendition of the Assyrian word *qurqurru*, a type of Mesopotamian riverboat'; Casson follows Salonen 1939: 51). The ascription of the *kerkouros'* invention to the Cyprians by Pliny (a garbled version of a tradition associating Egyptian κέρκουροι with Cyprus?) may well go back to Philostephanos (see p.112).

Greek ports (Plautus, *St.*367-8: '*conspicatus sum interim / cercurum, quo ego me maiorem non vidisse censeo*') and the use of one term in both spheres points to resemblance, if not identity, in construction and size[19]. The important point here is that this is the only certain instance anywhere of galleys of the size of triremes (and unspecified, but presumably less elaborate oarage) outside the naval sphere. There is no reason to consider these ships an Achaimenid, let alone Ptolemaïc, innovation: they may well have been in use long before the Saïte kings. Of course the Saïte kings may have modernized them after Greek or Phoenician models, for instance by mounting *dikrotos* oarage. This seems much more likely than Lloyd's notion of wholesale borrowing (see p.109 n.16).

I confess that I do not at all understand why the notion that the Saïte kings borrowed nautical expertise wholesale from Greeks or Phoenicians, is so eagerly espoused by Egyptologists (Drioton, Vandier 1984: 583; James 1991: 720ff.). Especially the idea that 'senior Greek mercenaries' had 'considerable experience in warfare by sea' and 'urge<d> their Egyptian employer to provide them with naval equipment without which they could not operate at full efficiency' (James *ib.*, p.721) is without any foundation, naval warfare of any scale being beyond the financial capacity of Greek *poleis* except Corinth (and Corinth's one recorded naval war took place in the West)[20]. It seems to me that Egyptian tradition, and indeed documentation, concerning the defensive strategies of the kings of the New Kingdom vis-à-vis their Asiatic frontier (see Drower 1973: 444ff. esp.445) and their use of naval forces in that context (see Hayes 1973: 367ff.), and the pressure politics of Nebuchadrezzar are more than sufficient as the inspiration of Necho's policies, and Amasis' too.

In Amasis' Egypt, therefore, the size of the trireme not only would not have been excessive, as it was for a *polis*: it probably would not even have been something novel. In the Egyptian context it is the *trikrotos*

---

[19] Hammond's affirmation that in Herodotos' list of the 'naval support vessels' in Xerxes' expedition (VII 97: triakontors, pentekontors, *kerkouroi*, horse transports) the order of size is descending (so that a *kerkouros* would be smaller than a triakontor), is a perversion of the facts: he makes triakontor and pentekontor change places in Herodotos' list (1988: 532). The order of size no doubt is ascending (*kerkouroi* and horse transports being of trireme size). There may have been smallish *kerkouroi*, but there are few data that have to be taken in that sense as can be seen in Torr's convenient synopsis of the literary evidence (1895: 110-11).

[20] As strange to me is the thought that 'there is agreement <??> that what Necho set out to do was to build up an Egyptian navy, albeit one ***manned by Greeks*** <my emphasis>' (James 1991: 721). Is there any evidence which precludes the use of Egyptian crews, such as occurs in later times (e.g. Paus.III 6.5)? Must we not assume that sufficient oarsmen were to be found in the Delta?

oarage of the trireme that is unexpected. For it must be remembered that a trireme, when used as a transport, as it would be in the Saïte navy, was most probably rowed on the *monokrotos* system, all but the thranite oarsmen making place for troops (see p.171f.). If therefore the Egyptian navy comprised triremes in the years before 525, as it did (see Hdt.III 4.2), it is the oarage of these ships that was new and needs explanation.

The creation of the trireme thus is a paradoxical development. The naval power which—as far as we can judge—needed its transport capacity, i.e. its size, will already have had ships of an older type of the same capacity. Furthermore, it would have had no evident use for its multiple oarage, because the oarsmen would have been in the way of the troops. The *polis* navies on the other hand, which possessed an adequate ship of the line (potentially at least) in the pentekontor, had no obvious use for either of its advantages. Nevertheless, the trireme really came into being.

The clue in my opinion must be sought in the two stages of the double scaling-up. If these stages occurred independently of each other, the paradox may disappear. On this assumption I would guess that the first step consisted in the addition of a third bank of oars—that of the *thalamioi*—to the two of the pentekontor. The resulting *trikrotos* galley with up to 72 rowers (14 + 11 + 11 a side) would come up to all the requirements of a *polis* without drastically exceeding its financial elbow room. Fully manned the ship would be faster than any *dikrotos* pentekontor, even Phokaian ones, and for a sixth-century *polis* that would be excellence indeed. Such superior speed, to be sure, was not without its cost, quite apart from the higher payroll: the third bank of oars had to be installed in the ship's *thalamos* on a supporting construction and the ship's sides had to be perforated to let the oars pass through (see Ar.*Ach*.553; *GOS* 269-70; *SSAW* 89). These changes, especially the latter, must have made the ship less easy to sell to merchants, and so rather more expensive than its *dikrotos* forerunner, but far less so than the trireme. And since such a *trikrotos* galley took up the same room as a pentekontor, naval installations did not need to be altered as they would for the fully developed trireme.

Such a ship would have been precisely what a *polis* like Carthage needed after the battle of Alalia, and the signs are that Carthage got something of the sort. Its navy had taken a beating but, as the subsequent departure of the Phokaians from Corsica suggests, it remained a danger. The conversion of a number of pentekontors into *trikrotos* galleys, i.e. the enlargement of their oar-crews, was the obvious answer

to the qualitative superiority of the Phokaian crews, when outnumbering them in ships had failed. This failure must have been a very powerful incentive for the Carthaginians to find such an answer.

There is no tradition that clearly ascribes this step to the Carthaginians. Nevertheless to ascribe it to them is no mere speculation, for it was held in antiquity that the *trikrotos* ship was invented in the world of the Phoenicians. Clement of Alexandria speaks of a tradition that the Sidonians were the first to build the *trikrotos naus* (*Strom.*I 16.76) and this tradition clearly fits in very well with the situation brought about by Alalia.

It is true that recently much scorn has been poured on this testimony by Lloyd. His argument is that 'In this section of the *Stromateis* Clement is trying to prove that "Non-Greeks (*barbaroi*) were the inventors not only of philosophy but also of nearly every craft"', and that therefore 'the profoundest scepticism of anything that <he> has to say in this section' is in order (Lloyd 1975: 49). No doubt. But, quite apart from the question whether Clement genuinely had that purpose (see Bolgar 1954: 49f.), his testimony cannot be eliminated so easily. As Lloyd acknowledges himself, 'it would be possible to find some more or less correct statements. The Χαλδαῖοι *did* invent ἀστρολογία and the Phoenicians *did* invent the alphabet...' so that 'statements can be accepted as are strongly supported by external evidence' (*ib.*: 50). But even this seems too strict. No doubt Clement's *claims* sometimes are based 'on an intricate web of muddled inference', but that need not affect the facts (or traditions) he adduces. The veracity of these facts and traditions not only depends on the availability of external evidence, but also on the creditworthiness of his sources, and in the case of the τρίκροτος ναῦς there is reason to conclude that he consulted a respectable one.

Clement mentions as his sources for this section of his work a number of scholars. Among them is Philostephanos of Kyrene, the author of a book about inventions, Περὶ εὑρημάτων. From this work Clement is considered to have taken the names of many, if not all, of the non-Greek inventors (see Gisinger 1941: col.112). Philostephanos' interest in the history of maritime inventions appears from two citations of his work by Pliny: *longa nave Iasonem primum navigasse Philostephanus auctor est ... ad duodecim ordines Philostephanus Ptolomaeum Soterem <fecisse>, ad quindecim Demetrium Antigoni, ad triginta Ptolomaeum Philadelphum, ad XL Ptolomaeum Philopatorem qui Tryphon cognominatus est* (*Nat.*VII 207-8); other inventions mentioned in the sequel may also derive from the same author. Clement himself (*Strom.*I 16. 75) may quote him for another invention by the Carthaginians, that of the

tetreres, and this ascription is in no way improbable: working as he did in Alexandria Philostephanos must have been well-placed to obtain the relevant information from subject Phoenicia. For this reason Clement's claim that the Sidonians invented the *trikrotos* galley is not to be rejected out of hand, as is done by Lloyd. The wording, moreover, is such as to suggest that no commonplace matter is involved.

So far Clement's claim concerning the *trikrotos naus* has always been taken to mean that the invention of the trireme is at issue: thus Lloyd[21], Basch[22] and Meijer (1986: 35). The same interpretation had already been proposed by Torr: '... if three-banked warships were built in Egypt about 600 B.C. as Herodotos relates <mentioning triremes>, they were probably in use in Phoenicia at a somewhat earlier date': Torr then quotes Clement (1895: 4 n.7). But this interpretation assumes what has yet to be substantiated: that Clement's *trikrotos naus* is equivalent to *triêrês*/trireme and this is not very probable. It is true that from Herodotos on (V 85.1) *triêrês* was also used in the general sense of 'warship' and that *trikrotos* was then employed to specify the trireme[23], but the technical meaning of trireme was by no means forgotten as appears from Dio, who uses the word in both senses (general: XI fr.43.23; technical: L 23.2). For this reason it cannot be excluded that Clement uses *trikrotos* not in the sense of *triêrês*, but in the technical sense of 'with three-banked oarage', and this is even more plausible in the case of Philostephanos, who as a writer on inventions, being especially interested in the development of oarage systems, will have used terms like *triêrês* and *trikrotos* in their technical sense. Since the invention and spontaneous adoption of the trireme was, as we have seen, unlikely in a *polis* of the archaic period, Clement's claim for the Sidonians must be taken in the sense that in 'Sidon' the *trikrotos* oarage system was developed by adding the *thalamian* bank to the two banks of the *dikrotos* pentekontor that had been used in Phoenicia since before *c.*700 (Ill.21). This step may well have been taken in Sidon itself (when Carthage was faced with the necessity of finding an answer to the continued Phokaian threat, it will have invoked the aid of its *mêtropolis*), but since

---

21 '...the relevant passage ... reads ... that the Sidonians were the first to build a trireme (*trikroton naun*)' (1975: 49).

22 '... une tradition qui attribue aux Sidoniens l'invention de la trière ...' (1977: 2, cf. 1987: 333.2).

23 E.g. by an anonymous rhetor: Aristid. *Or.*XXV (XLIII) 4. The Anonymus describes the Rhodian naval yards and the ships in them: 'τριήρεις δὲ ἐπὶ τούτοις ὑπῆρχεν ἰδεῖν δικρότους καὶ τρικρότους καὶ εἰς ἑπτὰ καὶ εἰς ἐννέα στοίχους ...'. By τριήρεις δικρότους he no doubt understands the Rhodian ἡμιολίαι (for which see *SSAW* 128ff.).

the term *Sidonioi* is also used as a synonym of 'Phoenicians' (*Comp.Hom.* 307), possibly including the Carthaginians themselves (see Von Soden 1959: 26-29), there is no need to take it literally.

The idea that the Carthaginians had something to do with the train of developments that after Alalia led to the genesis of the trireme may find some indirect confirmation in Greek tradition preserved by Thukydides (I 14.2). According to this tradition the western Greeks were the first to adopt the trireme as their line-of-battle ship and to reorganize their navies in the 'modern' manner, as is the implication of Thukydides' ἐς πλῆθος ('in great number'). Such a radical, and unexplained, step would be readily understandable, if the Carthaginians had previously improved their pentekontors with a third bank of oars to make them Clement's '*trikrotoi naus*'. The Sikeliots may also have taken over this improvement: Thukydides' 'triremes' could then be a mildly anachronistic intrusion into the tradition (though it is not to be excluded that the term τριήρης was already used for the smaller variant). Still, the naval lead of the Sikeliots may be alternatively explained as the result of the strengthening of central authority and finance of the *poleis* concerned by the tyrants, and their adoption of the trireme as the answer to the introduction of the eastern trireme into the Carthaginian navy.

In the years between *c.*535 and 525, when the event took place, the Phoenicians of the Levant were in two political camps: Phoenicia proper had become part of the Persian empire some time after 539[24]; Cyprus had been occupied by Egypt, probably at the same juncture[25]. The latter step, a move entirely consistent with Egypt's strategy of containment vis-à-vis powers dominating Syria, must have been extremely disturbing to the inhabitants of the coastal area. During the first half of the sixth century they had been in the thick of the confrontation between Nebuchadrezzar and the Saïte kings. Judah had been crushed between these heavyweights, and Tyre had had to sustain a thirteen year siege by Nebuchadrezzar (*c.*585-572: LXX *Ez.* XXIX 18; Men. Eph., *FGH* 783F7): it is more than probable that Egypt gave support (see Garelli 1974: 152). Nevertheless this association appears to have been very problematical, if there is any truth in Herodotos' report that the Egyptian king Apries marched against Sidon and fought against Tyre at sea (II 161.2; cf.D.S.I 68). Clearly the Phoenicians were reluctant to be involved in the

---

24 The Cyrus Cylinder (*ANET* 316): 'All the kings of the entire world from the Upper to the Lower Sea ... as well as all the kings of the West land ... brought their heavy tributes and kissed my feet in Babylon'. Cf. Olmstead 1960: 56; Cook 1983: 32; Ephʿal 1988: 156.

25 See Wallinga 1987: 60; Wiesehöfer 1990: 252.

conflict of the great powers, so that Egypt had to apply force to bring a party into power that was prepared to resist the Babylonians[26].

In this perspective the replacement of the Babylonian kingdom by an even stronger military power, and by one that had already eliminated Lydia (Egypt's ally of long standing) was a catastrophic event for Egypt. Now all its Syro-Palestinian allies of old surrendered to the new overlord of Asia. Possibilities to compensate for this serious set-back were hardly available. It is true that Amasis did what he could to make up for the loss of his former allies by occupying Cyprus (Hdt.II 180.2) and by allying himself with (or setting up as tyrant) Polykrates of Samos (Hdt.III 39: see p.85 and 88). Yet these new subjects and allies together had not the same weight as the allies lost, nor was their potential to bind enemy troops comparable, at least initially. Therefore there can be no doubt that Egypt's position was weaker now than it had been when Nebuchadrezzar was at the height of his power. In the Egyptian perspective any further negative change in the balance of power had to be prevented at all cost.

In this situation the eventual adoption of the *trikrotos* oarage by Phoenician cities must have been seen as a very serious threat to Egypt's position in this whole area. As Alalia had demonstrated, ships with superior crews could gain the advantage over a large numerical majority. Phoenician fleets in which at least the state-owned ships were three-banked could become very dangerous opponents of the Egyptian navy, the more so if the Phoenician naval establishments were of the same type as Corinth's[27] and a relatively great number of ships would consequently be altered to *trikrotos* specification. The danger to Egypt would be even more acute if those fleets were backed by Persia, not to mention the possibility that Persia would create its own navy with ships of this new type.

The Cypriot Phoenicians, under Egyptian control as they were, will hardly have been in a position to reinforce their navies in this way. For their metropolitan relatives on the other hand, the new oarage may

---

[26] Because of the extreme poverty of the tradition concerning this episode, interpretations differ widely. I have followed Ackroyd 1970: 10f. and Garelli 1974: 151-152, 246. For the view that Nebuchadrezzar' long siege finally was successful see e.g. Bondi 1990: 259 and Wiseman 1991: 235. Mitchell seems to lean towards the position of Ackroyd (1991: 415).

[27] There is of course no direct evidence whatever for the organization of the Phoenician navies (for a suggestion see p.30). Certainly there is no positive evidence for the all too common view that the 300 'Phoenician' triremes in Xerxes' armada (plus the Cyprian triremes) were identical with the naval arm the Phoenician cities would have been capable of mobilizing on their own (see e.g. Bondi 1990: 266).

have opened interesting perspectives, if at the moment this option presented itself to them they had not yet 'given themselves' to the Persians. It would make the choice whether to do this or not more real and give them a basis for negotiations. As long as the Persians had no naval arm of their own and no plans to attack Egypt directly they must have welcomed every possibility to slacken the potential hold Egypt had on their (other) coastal possessions[28].

All this is to say that, just as the Carthaginians after 'Alalia', the Egyptian king came under strong pressure to strengthen his navy by equipping his '*kerkouroi*' with *trikrotos* oarage and thus making his ships into 'triremes', i.e. real warships, adapted to all fighting requirements, but still fit to transport as many troops as before. His possession of Cyprus would enable him to use these ships with much effect against the cities in Phoenicia. If they intended to do no more than to equip their 'pentekontors' with a third bank of oars, these *trikrotos* galleys would be outranged by the Egyptian 'trireme' from the beginning. The development of this ship would moreover enable the Egyptians to preclude a similar scaling-up of the Phoenician *polis* navies, 'triremes' for which would have to be built under the king's watchful eye and within reach of his new ships. But such modest objectives would not exhaust the potential of the new warship. Apart from its many-sidedness as a naval unit the trireme must also have been a much superior sea-going vessel thanks to the reinforcement brought about by the framework of the rowing-benches and their supporting structure. The chief practical effect of this improvement was to increase the seaworthiness, i.e. the range, of the ships, so that it now became possible to envisage active military collaboration with much more distant powers than those of the Syro-Palestinian area (such as had not been feasible in Necho's times). The alliance of Amasis with Polykrates that already had led to the development of the *samaina* would gain even more force and flexibility if substantial numbers of the new type were put to use: much larger

---

[28] If Eph'al is right in describing the position of the Phoenicians as enjoying 'a unique political status, involving a considerable degree of independence within the Persian empire' and in stipulating that 'we have no evidence that <the local kings> were in any way answerable to the Persian authorities' (1988: 156-157), this may well be the result of this naval collaboration. That the Phoenicians were sent home immediately after Salamis and before Mykale (DS XI 19.4—where the idea that the Ph. departed on their own initiative evidently is a Greek misunderstanding—and Hdt.IX 96.1) at any rate suggests that the Phoenician interests counted heavily for the Persian staff. But in Herodotos' taxation list there is no trace of privilege for the Phoenicians. Eph'al's view probably is largely based on an exaggerated estimate of the naval contribution of the Phoenicians.

numbers of troops could then be transported in less time[29] and this would force the opponent of the Asian continent to keep even more of his (land-)forces in reserve against the sudden enemy concentrations that now became practicable.

Regarding the steps taken in this connection the evidence is particularly defective, precisely where Egypt is concerned. Only one Egyptian trireme is specifically mentioned as belonging to Amasis' navy: it was used in the chase of the defecting mercenary captain Phanes (Hdt.III 4.2). Still, Phanes' overtaking and arrest in Lycia[30] nicely illustrates the range and superior speed of the new type and can for that reason be taken as a valuable clue—but no more than that—to what was afoot in Egypt. The 40 triremes in Polykrates' navy on the other hand speak more clearly. We shall never know the precise status of this squadron. It may have been genuinely Samian, having been built there, though of course largely at the expense of the Egyptian king and destined to serve his interests. But I would not exclude that the ships had been built in Egypt, where I would assume that expertise to build ships of this size had long been available. In the latter case especially it would follow that at least a comparable number had been equipped or built for the Egyptians themselves. As we shall see, the tradition concerning the numerical strength of the Persian navy suggests that the Persian command reckoned with at least twice the strength of the Samian navy (see p.123)[31].

Such possibilities as were opened by the availability of the new naval arm obviously must have occurred to the Egyptian king: his foreign policy (as well as that of his predecessors) had always been framed in such terms. A strategy on the new basis promised to put the Persian position in the whole coastal area from Gaza to the Aegean in jeopardy. For with resolute and united leadership the combined sea-power of Egypt and Samos could have done what the Ptolemies accomplished in the third century B.C. and was not beyond the reach of the Athenian empire (nor evidently beyond the aspirations of its leaders) in the fifth,

---

29 The narrower trireme being faster than the broad-bellied *samaina*.

30 Lycia is not at all along the route toward the residence of Kambyses, where Phanes is said to have been headed. This anomaly is the one indication we have that the story of his conflict with Amasis and his flight is not to be taken on trust—as it is as a rule—and has been drastically revised in the perspective of Kambyses' conquest of Egypt.

31 That the tradition is so silent about the Egyptian triremes and precise about the Samian ones may have to do with the circumstance that in Samos the trireme was something entirely new, whereas in Egypt it was hardly different from the type used since the days of Necho, especially so if these ships were already equipped with *dikrotos* oarage.

namely to wrest the whole of this coastal area from the grasp of the continental power.

2 *The creation of the Persian navy*

There can, then, be no serious doubt that by 530 Persia's position in the coastal parts of the empire was acutely threatened by the alliance of Egypt and Polykrates and their combined naval arm. Therefore the tradition that it was the Persian king Kambyses who succeeded in answering this threat and thereby 'conquered Egypt and the sea' (Hdt. III 34.4), which has never been taken seriously[32], must be taken to the letter. Kambyses was indeed the creator and organizer of an authentic *Persian* navy, which in the beginning 'depended on the Phoenicians entirely', as Herodotos meaningfully stipulates (III 19.3), words far from suggesting that Kambyses' naval arm consisted of pre-existing Phoenician warfleets. What this dependence in fact involved is explained in Diodoros' notice concerning the Greek contribution in ships to Xerxes' expedition, that 'the Greeks provided the complement of men and the king supplied the vessels' (XI 3.7). This remark[33] must be taken seriously: Diodoros no doubt owes his information here to Ephoros of Kyme. Concerning its veracity two considerations are relevant: in the first place that Ephoros' native city, Kyme, had been an important base in the Persian naval organization[34] and that Kyme for that reason must have been one of the cities where reliable information concerning that organization was available; in the second place that Polybios praised

[32] Kambyses' conquest of the sea is invariably disregarded or belittled (see for instance the commentaries of Stein, How, Wells and Van Groningen: the latter's gratuitous assertion that Kambyses conquered the sea 'only indirectly, in sofar as Camb. conquered seafaring peoples and cities' probably voices a widely held opinion).

[33] See Blackman 1969: 184 n.18: 'Note ... Diodorus' remark ... that Xerxes "provided the ships" or perhaps rather "covered the cost of the ships" ... Was it therefore beyond the subjects' obligations to pay for the ships, though they might be called upon to build them?'. This is the only comment on the remark known to me. It is curious that its author both in this case and in that of the ship-contributing members of the Delian league totally fails to allow for the danger to the imperial power the ships in question would have represented, had they been in the hands of the subjects/allies in the numbers he assumes.

[34] Kyme, or the coastal strip of which it was the central place, was the basis of Xerxes' naval forces: the ships assembled at Kyme and Phokaia early in 480 (D.S.XI 2.3), after Salamis the remaining ships wintered there (Hdt. VIII 130.1; D.S.XI 27.1). Herodotos' report that Kyme had its own Persian *hyparchos*, who in 480 commanded his own squadron (VII 194.1), strongly suggests that it had a more permanent function as a naval base. The *hyparchos*' squadron may have been one of the Persian 'peace-time patrols' (see Wallinga 1989: 174 and 1991: 281).

Ephoros as a maritime historian (XII 25f.1-2[35]). It is indeed a fact that some references to the Persian naval organization, which go back to Ephoros' history, display a coherence which will have its basis in adequate information: the fleets are habitually described as 'royal ships'[36].

Ephoros' picture of the Persian naval organization seems to be contradicted by Herodotos. In descriptions of Persian naval forces he suggests that the naval organization of the Persians was analogous to the auxiliary system the Romans employed before 260 as a reinforcement of their own rudimentary navy (see Thiel 1954: 32). He makes the maritime subjects of the Persians 'furnish ships', ships called Ionian, Cilician, Phoenician etc. as the case may be (VII 89ff.). Are these, and similar formulas[37], seemingly massive evidence, sufficiently unambiguous to controvert Ephoros' testimony? It seems to me that they are not. It is significant in the first place that the Herodotean formula also occurs in Ephoros and his dependents: the ships described by Diodoros as furnished by the king in 480 are nevertheless called Greek (Ἑλληνίδες), and the Royal Navy (βασιλικὸς στολός) mobilized in 449 is described as consisting of Phoenician and Cilician ships (Plu.*Cim.* XVIII 6). This usage is not unnatural in the context of an organization as is implied in Ephoros' testimony as a whole. If the naval service imposed on subjects was sufficiently compensated by good pay or privileges[38], these subjects may well have been proud of the squadrons they served in and have considered them their 'own'. And some of them may well have been more 'own' than others: if, as I believe, the Persian naval organization included 'peace-time patrols', such as are known in the tradition about the Delian league, the Persian subjects involved in the maintenance of these patrols really would have had their 'own' ships to

---

[35] In view of Polybios' evident esteem for Ephoros' 'descriptive power and expertise' Schwartz' assertion that 'wenn der in solchen Dingen strenge Kritiker die Seeschlachten des Ephoros besser beurteilt, so heisst das nur, daß die nautischen Manöver nicht so dargestellt waren, daß ihre Unmöglichkeit sofort beim Lesen einleuchtete ...' (1957: 17-18) is all too complacent.

[36] See Ephoros *FGH* 70F192 = Plu.*Cim.*XII 5; Plu.*Cim.*XVIII 6 and Nepos, *Milt.* VII 3, where the inhabitants of Paros who are besieged by Miltiades expect help from *classiarii regii.* The term βασιλικὸς στολός used by Ephoros also occurs in the one preserved fragment of Lysanias of Mallos (*FGH* 426F1: see p.134f.). Here again, as with Ephoros, we have to do with an historian who may have had access to valuable local tradition: Mallos was situated near the chief naval base in Cilicia (see Wallinga 1991: 278 n.6).

[37] Hdt.VI 9.1, VI 118.1; VIII 14.2, VIII 118.1, 121.1, VIII 130.2 respectively. Cf. Th.I 116.1,3, VIII 46.1 al. and the phrase 'the navy of the Phoenicians' (Th.I 16).

[38] The position of the Sidonians in Xerxes' expedition, as pictured by Herodotos (e.g. VII 99.3 and VIII 67.2ff.), and also that of the Halikarnassians and their queen (*ib.*), illustrate this point.

furnish. Sidon and Halikarnassos are most likely to have been in that position[39], so that it could well have been in his home town that Herodotos picked up traditions which caused him to write as if the subjects furnished ships (crews included) instead of the crews alone. Moreover, the adoption of the usage of Halikarnassos (and Sidon, if this was known to Herodotos) to describe the Persian naval organization as a whole was obviously favoured by the analogy of the Delian league.

Still, there are other, and even better, arguments to reject the unthinking acceptance of Herodotos' formula as an adequate description of the Persian naval organization[40]. To begin with, the relationship implied therein between the imperial power and the subjects is without any parallel and on reflection very hard to believe. The Romans, it is true, required the same sort of service from their *socii navales* for a time, but then these subjects did not pay any tribute, and accordingly were honoured with the euphemistic title of 'allies'. In the traditions concerning the Persian empire such a title is absent[41] and there is no mention of such privileges for the subjects enlisted in the naval forces. Quite to the contrary, the tribute they paid is in no way distinguished from that of the non-naval subjects. This already makes the current view of Persian sea-power difficult to swallow. What is even harder to accept is that an imperial power would have entrusted to subjects a major sector of its defence, a sector located in the territory of the subjects themselves of all places, so that they would have been expressly provided with the military means to revolt. In this respect the Roman parallel is most instructive: as long as the Romans' need of a naval arm remained intermittent and small-scale, the Romans had imposed part (no more!) of the burden on their subjects, maintaining a small navy of their own. But as soon as they were involved in a large-scale war with a naval power, they had to decide to have their own navy (see Thiel 1954: 37). And this parallel is instructive in another respect. The decision of the Romans to build their own navy must have been unavoidable because the ships of their allies, just as their own: triremes and smaller units (*Ib.* 33 n.89), were no match for the Carthaginian enemy who had quinqueremes (and note that no quinqueremes were built by or for the Roman allies!). Just the same kind of coercion must have forced

---

39 See Meiggs 1972: Endnote 13; Wallinga 1989: 174ff.

40 In fact its meaning is unjustifiably widened.

41 In describing the Naxian expedition Herodotos employes the term σύμμαχοι for the non-Persian troops mobilized (V 32: ὅμιλον Περσέων τε καὶ τῶν ἄλλων συμμάχων), but here he surely takes it in the sense of 'fellow-combatants' (as e.g. I 102.2; the s. are *not* the Ionians!).

Kambyses to create the Persian navy of triremes. Herodotos has preserved a tradition regarding Persian sea-power that implies precisely this. Reporting on the situation in the eastern Aegean at the moment of the Persian conquest he stipulates that the islands then remained out of danger, because the Phoenicians were not yet subjects, nor the Persians themselves sailors (I 143.1: οὔτε γὰρ Φοίνικες ἦσάν κω Περσέων κατήκοοι οὔτε αὐτοὶ οἱ Πέρσαι ναυβάται[42]). The meaning of the last-quoted phrase is clear from Plutarch's pithy summary of what Themistokles had done to the Athenians in 483: 'instead of steadfast hoplites' he had made them 'navy men and sea-dogs' (ἀντὶ μονίμων ὁπλιτῶν ... ναυβάτας καὶ θαλαττίους: *Them.*IV 4[43]. Just as Themistokles created Athens' navy in 483, so the creation of a *Persian* navy is implied in Herodotos' phrase.

And there is a final, and clinching, piece of evidence. Describing the Persian attack on the rebellious Cyprians in 498 Herodotos makes clear that these former subjects did not have warships of their own. When the Ionians came to their help with a fleet, the Cyprians made the following proposal to them: 'Men from Ionia, we Cyprians give you the choice of opponent, Persians or Phoenicians. If you prefer to take the field as foot-soldiers and to engage the Persians, now is the time for you to disembark and to take up your positions on foot, and for us to man your ships to fight the Phoenicians' (V 109[44]). Clearly the Persian ships

---

42 It is very curious that commentators fail to annotate this phrase, as if its meaning were self-evident. Starr's paraphrase of it as saying that 'the Persians were landlubbers' (1989: 26) is misleading: the adverb κω qualifies the second part of the sentence as well. There are no grounds for taking ναυβάται in the sense of ἐπιβάται as is done by Italie, Radt, *Ind.Aesch. s.v.* ναυβάτης.

43 Plutarch here quotes Plato (*Leg.*IV 706C), changing Plato's ναυτικοὺς to ναυβάτας.

44 Commentators have missed the implication of the Cyprian proposal (it is barely mentioned or entirely left aside in recent treatments of the Ionian revolt: Tozzi 1978: 177; Murray 1988: 483): Stein and Van Groningen do not even try to give sense to it. Macan's note—'This amphibious idea, that the same soldiers could fight equally well on sea and on land, would imply a comparatively rudimentary condition of the arts of war at the time, if the recorded offer was ever made' (1895 I, p.258)—is only a (not very happy) beginning and misses the main point. His further remark that 'The offer no doubt is confined to the fighting-men: the oarsmen presumably were to stay where they were' may be right as far as it goes, but it may well be that the Ionian oar-crews were liberally supplemented with Cyprian rowers without Herodotos' informants mentioning it, and that this, plus the fact that the ships were not strictly Ionian property, led to the Cyprian proposal. I see no reason for the view of both Macan and Van Groningen that 'patronising airs of superiority' were 'assumed by the Ionians', nor for the latter's suggestion that the Cyprian proposal is a sign of self-confidence. For since neither of the allies had other than training experience with triremes (at best!), the Cyprian offer was rather generous: the naval fighting was the unknown quantity.

the Cyprians had to man (see e.g. Hdt.VI 6), and so were familiar with[45], were kept outside their reach. They will have been kept in safe-keeping in the main naval base in Cilicia, which was near enough to allow for the speedy mobilization of 'Cyprian' ships.

My conclusion is that the traditional view of Persian sea-power must be abandoned. The Persian naval arm consisted of Persian ships, manned at the oars by subjects: its creation made Kambyses the conqueror of the sea (Hdt.III 34.4).

Virtually no information has been preserved concerning the actual realization of this naval arm and the infrastructural works it entailed, but it must be considered certain that both were on an unprecedented scale. The building of a huge number of specialized warships was only the beginning; at least one naval port had to follow; and especially, since this port had to be installed in subject (i.e. potentially enemy) country, it had to be fortified and garrisoned. Veritable naval bases had in other words to be created. Moreover, important categories of naval personnel—seamen, oarsmen and marines—had to be levied and trained and all this had to be financed.

Miserably defective though our evidence is, it just allows us to see that all these things were accomplished. Triremes were built to the number of in all probability 300; crews were found and trained; and the navy thus formed clearly contributed to the downfall of the Saïte king in 525, probably by overawing its Egyptian counterpart into inactivity[46].

---

45 This of course must be assumed. The Persian navies of the Levant and the Aegean must both have practised, though the absence of any reference to it may well signify that the Persian 'peacetime-patrols' were a model for their Delian counterparts also in this respect. And without Plutarch's testimony (*Per.*XI 4) we would have no specific information regarding the latter. Plutarch suggests that the Delian patrols had the important function to train the crews. This seems to imply that only a small part of the ships and of the rower potential were involved in regular training. If so, the motive no doubt was economizing on the rowers' wages. In operational fleets the trained rowers then could be employed as thranites and the zugian and thalamian oarsmen integrated with them into one oar-crew in a crash course. The procedure Xenophon ascribes to Iphikrates in 372 (*HG* VI 2.27ff.) probably was exceptional only insofar as he had started out on his campaign with exceptionally few experienced rowers (*Ib.*12 and 14).

46 That is the least one may infer from the lack of any mention of the Egyptian navy in Herodotos' account of what happened in 525. Not even its commander Udjaharresne (Uzahor-resenet), who had important functions under the Achaimenids and accordingly is often seen as a traitor (see now Ray 1988: 258), mentions it in his autobiographical inscription. This suggests that a conflict concerning its use had paralyzed the naval command. Such a conflict might well have arisen in connection with Samos, e.g. about the number of triremes to be placed at Polykrates' disposal (see also p.123 n.48).

Whether any of the infrastructural works had been started or accomplished when Kambyses mobilized his new navy must remain uncertain for lack of any recognizable evidence[47], but nevertheless is more than probable for elementary strategic reasons. I shall comment on all these aspects of the naval organization.

First the ships. Since (exceptionally) no figure is mentioned in Herodotos' account of Kambyses' Egyptian expedition, the order of magnitude of the naval forces in it must be inferred from circumstantial evidence. This evidence is relatively unambiguous: since Polykrates had a fleet of 100 pentekontors/*samainai* and at least 40 triremes (Hdt.III 39.3 and 44.2), and since the Egyptian navy may be put at the same strength as a minimum (all the ships being altered to triremes?[48]), Kambyses must have aimed at roughly 300 units as a minimum. Nor is this number a mere estimate, for it is a constant feature in the traditions concerning later exploits of the Persian navy: whenever figures are brought up, they turn out to be 300's or multiples of 300[49]. As far as I know, this constancy has not been explained (partly because scholars have been more concerned with casting doubt on all these figures than with interpreting them), but if in 525 the Persian navy started out with this strength—as the equivalent of that of potential opponents—the exact recurrence of this figure clearly was due to conservatism, not an unheard-of factor in the military, nor for that matter in the naval, sphere. The Persian naval staff clearly thought in terms of three hundreds.

Herodotos emphatically states that the crews of this new navy were predominantly Phoenician (III 19.3: 'the whole of Kambyses' naval force depended on the Phoenicians' and in the circumstances that must have been unavoidable. The Persians did not have something like the Roman boarding-bridge to compensate for the rawness of their crews (officers and marines especially, though most oarsmen cannot have had experience of *trikrotos* ships either). For this reason they truly were

---

[47] Such evidence may well be available, but has not been searched out so far. What I am thinking of is the chief naval base in Cilicia, remains of which ought to be recoverable (see Wallinga 1991).

[48] One could speculate that the Egyptian high command had been in two minds about altering its '*kerkouroi*', since they will have expected to use them chiefly as transports, whereas Polykrates' 40 triremes were intended for other tasks. This could have led to unpreparedness of the Egyptian navy at the moment of Kambyses' attack. Hence perhaps disaffection among the naval staff led by Udjahorresne himself.

[49] 600 in the Skythian expedition (Hdt.IV 87.1); 600 at Lade (Id.VI 9.1); 600 in the expedition of Datis and Artaphrenes (Id.VI 95.2); 1200 in Xerxes' expedition (Id.VII 89.1); more than 300 at Eurymedon (Ephoros *FGH* 70F192: 350; Phanodemos *FGH* 325F22: 600; DS XI 60.6: 340); 300 against Kimon in Cyprus (DS XII 3.2).

'dependent' on experienced sailors and rowers. Once commanders, officers and fighting crews had gained their sea-legs and the navy settled down to routine, crews could be raised among the less professionally seamanlike of the coastal subjects, as indeed our sources stipulate. Of course this was a very necessary step: the economies of the Phoenician cities would have been wrecked if the Persians had tried to make their navy depend on Phoenician manpower permanently and to withdraw a large percentage of the professional seamen from their normal employment in the merchant service.

Once the idea of this naval arm was conceived installations had to be set up where the ships could be built and serviced and above all could be guarded against attackers, both foreign enemies and rebellious subjects. Again there is almost no evidence: the only mention of a naval base that could have something to do with Kambyses' expedition is Strabo's remark that Palestinian Akê (Acco: the later Ptolemaïs) was used by the Persians as a base of operations against Egypt (XVI 2.25 C758). Neither Akê nor any port or roadstead in the neighbourhood is ever mentioned elsewhere in connection with the Persian navy, though Nepos mentions Akê as the place of Datames' preparations for an expedition against Egypt (*Dat.*V 1.5); other naval operations against Egypt appear to start from Cilicia (DS XI 75.2, 77.1). Strabo may therefore refer to Kambyses' expedition. If so, this would be in keeping with the protagonist's part of the Phoenicians in this expedition: and the location of Akê—precisely on the border of Phoenicia and Palestine—appears to be chosen for its position near Egypt and also so far South in Phoenicia to reduce the chances of a Phoenician coup de main. Later the chief naval base was in Cilicia (see Wallinga 1987: 74-75 and 1991), a location no doubt selected because Cilicia was not prominent at sea[50] and was conveniently situated between Phoenicia and Karia (the latter part of the *parathalassia* also became an important factor in the naval organization of the Persians: *ib.*, p.54 and 279 respectively). In view of the urgency of the crisis of 525 the installations at Akê may well have been improvised and left without any permanent constructions, but still there had to be a safe and permanent harbour for the ships when they came back from Egypt. I have little doubt, therefore, that the laying-out of the base in Cilicia had already begun when Kambyses' expedition started out. Its existence is documented for the first time in 490 (see Hdt.VI 95.1[51]).

---

[50] Just as the chief Aegean base was located in the area of Kyme and Phokaia, neither of them prominent maritime centres at the moment the Aegean fleet of the Persian navy came into being.

[51] Herodotos says that the man who reduced Samos started the operation by

Organizing, and arranging for the financing of, all the building activity and the use of the resulting naval forces must have brought with it untold problems, the more so since the whole undertaking was without precedent[52] and also because, as I already hinted, it must have been impossible to put off any important part of the it for long. It is of course impossible for us exactly to assess the quantities of material, the number of the personnel, labour and crews, and the costs involved, but it is clear that everything was on a huge scale and rough estimates can confirm this.

Assuming that Kambyses had based his decision to create the navy on an estimate of the costs for a number of years to come, say twenty[53], at least the following five points must have been considered. Firstly the building, maintaining and finally replacing of the ships: if the cost of construction of one trireme is put at half a talent (like it was in Athens in 483: see p.153), and upkeep over twenty years assessed (arbitrarily) at the same amount, 450 talents would be needed. Secondly the infrastructural works (slipways, ship-sheds, gear stores etc. and above all defensive works): Isokrates put the cost of the fifth-century Athenian ship-sheds alone[54] at no less than a thousand talents (VII 66). As the Persians had to build far more (on virgin soil and not near a great harbour!), this item in their accounts will have run into at least something like double this amount. Thirdly defence: in this connection we must think of the cavalry division that was stationed in Cilicia, no doubt to guard the naval base (see Wallinga 1991: 280), and cost 140 talents a year, 2800 in twenty (I feel certain that these troopers were only the outer ring of a more elaborate system of defence, but I shall not try to specify the other elements: for this reason the 2800 talents must be

---

going ἐπὶ τὴν θαλάσσην (Hdt.III 141). This may well be a technical term in the Persian context signifying the naval installations in Cilicia: see Wallinga 1991: 278-279.

[52] This is true for the whole of the empire as it then was. Only in Egypt a similar, but no doubt more modest, building programme may have been realized by Necho and that was long ago. Still the problems of maintaining a large navy must have been well-known in Egypt and knowledge of this kind may well have been more important in what Phanes of Halikarnassos had to offer the Persians than what Herodotos heard (III 4). Even better information was to be had from the commander of the Egyptian navy, Udjahorresnet, and this may again be a better explanation of this man's favoured position with Kambyses and Darius than simple treason (I would assume that Udjahorresnet started to give advice after Egypt's collapse).

[53] Twenty years was the life expectancy of a trireme and no doubt of pentekontors and '*kerkouroi*' (see *SSAW* 90 and n.68). To base Kambyses' estimate on this figure is of course arbitrary, but at least it is an important time unit that will have played a part in the calculations.

[54] Morrison (*GOS* 188) erroneously speaks of 'naval installations'.

considered an absolute minimum). Fourthly: as argued earlier there is reason to assume that permanent patrols, such as are known in the Delian league, were a feature of the Persian naval organization[55] as well; assuming the same aggregate strength for both 'units'—60 triremes—and putting the pay of the 'Persian' crews (120 men per trireme on an average[56]) at two thirds of the 'half drachma rate' of the mid-fifth century[57] we may assess the yearly cost for eight months active service at 60 x 240 x 120 x 1/3 drachma = 96 talents, 1920 in 20 years. Finally large-scale actions like the attack on Egypt must have been foreseen and the cost involved estimated, however roughly: six months service for 300 ships as just described would amount to 360 talents, and to 720 if two such actions were foreseen for the whole period[58]. Taken together these items amount to 7890 talents, some 400 talents a year, i.e. a very large part of what was to be the empire's money income under Darius I's tributary régime[59].

These figures may be no more than very rough estimates, but they are surely in the right order of magnitude. They make clear how radical Kambyses' decision to create his navy was, given especially the lack of a stable system of finance[60]. Its implementation must have entailed measures amounting to little short of a revolution and, though this revolution is not precisely recognizable in the tradition, traces of the concomitant crisis (or crises) are evident in the traditions about Kambyses' madness and the revolt of Bardiya/Gaumata.

---

[55] In the roster of the Persian navy of 480 three of these patrols seem fairly certain: first that of the Kymaian *hyparchos* Sandokes (Hdt.VII 194), second and third the squadrons of Queen Artemisia and of the Sidonians (Id.VII 99.3). A fourth may be that of the Paphian commander Penthylos (Id.VII 195). See Wallinga 1989: 174-176.

[56] 120 is of course a mere guess, but will be too high rather than otherwise (for the problem of the crews see Appendix). There is in any case no reason whatever to follow Hammond in putting the personnel of 'Phoenician' triremes at 240 (1988: 504).

[57] See Finley 1978: 112: this 'rate' is conjectural, but plausible. I assume that pay may have risen (or money depreciated) in the 75 years between Kampyses and the middle of the fifth century.

[58] It is most probable that naval action against Polykrates was planned to follow the conquests in Africa, at least up to the moment Polykrates changed front (if that was what he did: see p.99).

[59] On the hypothesis that in Darius' system the imperial tribute was generally monetized, i.e. that the tribute of all the *nomoi* was assessed in terms of coin, but that only western Asia actually paid in coin, the other *nomoi* in kind (see Polykleitos of Larisa *FGH* 128F3a and Wallinga 1984: 409-413).

[60] This can be inferred from the tradition that Kambyses was a despot when taxation was concerned: Hdt.III 89.3 and see Wallinga 1984: 407ff.

In his important essay on the genesis of the trireme (1987: 332-335) Basch has very properly emphasized that a warship of the class of the trireme would never have been introduced in the navies of the archaic age if the states concerned had not been forced by 'une nécessité absolue' (333.1). He further argues, also entirely reasonably, that in the Aegean world such a necessity only arose from the moment the Persian king was able to direct his fleets ('flottes personnelles', whatever that may mean) from Phoenicia to Ionia. Again he rightly adopts Hammond's observation 'that the <Greek> states nearest to the Persian and the Carthaginian navies seem to have adopted the trireme more quickly than the states of the Greek mainland' (1959: 202, meaning Samos, Korkyra and the Sicilian tyrants).

From this argument it would seem to follow that strategic necessities in the Persian and Carthaginian spheres of influence were decisive in the genesis of the trireme, as has been my contention. Basch, however, thinks that these strategic necessities had nothing to do with Persia and is of the opinion that he can go much further back in time, for according to him the Greeks created their triremes under 'la menace que représentait l'approche des trières *phéniciennes et puniques, déjà constituées en grandes escadres*' (333.2: my italics). He dates the beginnings of this threat to the middle of the seventh century (334.1). In proving his case he strangely asserts that what he had just declared impossible in the Greek world actually took place in Phoenicia, viz. the development of the (Phoenician) trireme without a 'nécessité absolue'.

According to Basch three factors influenced this development. First there was a long tradition of war at sea between the cities of the Syro-Palestinian coast, beginning in the times of the domination of Egypt under the 18th and 19th dynasties, which led to the creation of 'navires de guerre spécialement conçus à cette fin' in the 11th century[61]. Next the permanent rivalry between Tyre and Sidon made these cities prone to use this particular weapon. And finally the continuing hostilities between Tyre and the other Phoenician cities resulted in the latter collaborating with the Assyrian king (Shalmaneser V: see Katzenstein 1973: 224ff.) and furnishing him with sixty ships, which according to Josephus were vanquished in a battle by twelve Tyrian ships (*AJ* IX 283-287).

On the face of it this is a presentable hypothesis, offering a phased

61 He exemplifies these 'specialized warships' in Cyprian boat-shaped rhytons and a picture on a Syrian funerary urn (Basch 1987: fig. 313-316). The ships represented, needless to say, do not display any features which would necessarily make them warships: all are simple galleys.

development that leads to a serious crisis which could have occasioned innovations. On reflection, however, it is clear that many elements in it hardly have any historical standing. This is true in particular of the long Phoenician tradition of war at sea, which is pure speculation and probably based on the misleading analogy of the supposed early Greek wars at sea. But just as naval war was a very rare occurrence in the Greek world (see p.38 at n.16), it ought not to be surmised gratuitously for the Phoenician, nor even for the foremost of its cities. Reciprocal raiding and making reprisals is the most one may legitimately assume. It is very significant that it only came to a regular sea-battle in connection with Assyria's operations, i.e. when the big power of the times became involved: one may safely assume that Assyrian subsidies were essential in the mobilization of the sixty ships against Tyre (but note that this is something totally different from the creation of their own very superior navy by the Persians!).

Although he does not make himself clear on this point, Basch probably considers the numerical disproportion between the attacking fleet and its victorious Tyrian opponent, sixty versus twelve ships, the reason for the owners of the former to try to find a means to neutralize the superiority of the Tyrian navy. Prima facie the situation may indeed look very similar to that in the West after the battle of Alalia, but how different is the source. Josephus' account derives from Tyrian records via Alexandros Polyhistor and Menandros of Ephesos. Its text is marred by curtailments and omissions and the precise number for the Tyrian ships is most uncertain[62]. This account cannot therefore be the foundation for such a far-reaching conclusion as Basch's. But even if this is accepted as a possibility, the situation in the West on the eve of the battle of Alalia proves that there certainly were no 'trières puniques constituées en grandes escadres' at that juncture. And this fact is fatal for Basch's argument.

It is as fatal for Necho's triremes. In my discussion of this anomalous datum (see p.104-5) I have already suggested that what makes the appearance of the type in Necho's navy so improbable is the lack of a

[62] Two manuscripts (L and V) have the variant δύο for δεκαδύο. See also the comments of Katzenstein 1973: 220 ff. K. makes Josephos' text more corrupt than it is of itself by accepting a most improbable reading (ὀκτακοσίους) in the sentence describing the naval mobilization against Tyre (Φοινίκων συμπληρωσάντων αὐτῷ ναῦς ἑξήκοντα καὶ ἐπικώπους ὀκτακοσίας SP; r has -ίους, which is rightly rejected by Jacoby *FGH* 783F4 = J.*AJ* IX 285). What the Phoenician cities furnished to the Assyrian king was 60 ships (of the line) and 800 oared boats (no doubt as transports; the figure is huge and may be corrupt, but cf. Hdt.VII 97); 800 oarsmen makes no sense at all.

respectable context for its invention before 600: Basch's (and anybody else's) failure to provide such a context corroborates the suggestion. Necho's triremes may therefore be ignored henceforward.

On the other hand, the very critical situations existing in the Mediterranean during the thirties of the sixth century, both in the Tyrrhenian area and in the coastal regions of the Persian empire, provide precisely the context required. They thus serve to explain the development of what was to prove the most successful naval innovation of ancient times.

CHAPTER SIX

THE TRIREME IN HELLAS: THEMISTOKLES' NAVY BILL AND THE PERSIANS

1 *The Persian navy and the Greek world (525-483)*

There is very little echo in Herodotos of the events just preceding the subjection of Egypt by Kambyses. I leave aside the story of the defection of Phanes of Halikarnassos (Hdt.III 4ff.) which entirely ignores the naval aspect of the conflict between Egypt and Persia and for that reason alone cannot be taken as an adequate report of the conflict's preliminaries. There is further the bald statement that Ionian and Aiolian Greeks were mobilized for Kambyses' expedition (Hdt. III 1.1) and mention is made of one single Mytilenaian ship—implicitly represented as a trireme[1] —which transported the herald summoning the Egyptians to negotiate for peace (*ib.*13-14). But there is no report on the part played by the naval forces in the hostilities, and no detail concerning their organization, command or bases except that they 'depended' almost entirely on the Phoenicians (πᾶς ἐκ Φοινίκων ἤρτητο ὁ ναυτικὸς στρατός: *ib.*19.2-3). The contribution of the Greeks cannot therefore have been more than nominal. The tradition ascribed a plan to Kambyses to use this navy to conquer Carthage, a plan frustrated by the refusal of the Phoenicians to move against their 'children' (*ib.*). This 'plan' looks very much like an armchair strategist's fancy; moreover, the typically Greek motive of the Phoenicians (cf. Hdt.VIII 22.1 and Graham 1964: 27-28), throws even more doubt on the plan as a whole, although one cannot entirely exclude that Kambyses could have conceived such a project (see p.162 at n.79). But since nothing came of it, it may be left aside. There certainly is no point in speculating about the composition of the naval force that was to participate[2].

---

[1] The lynching of the crew of the Mytilenaian ship was avenged by the Persians in the execution of ten Egyptians for each crew-member, 2000 for 200 in all (III 14.4-5): 200 makes for the maximum crew of a trireme (see p.169). This specification could easily be due to mere calculation like Herodotos' total for the Persian crews in 480 (VII 184.1), but in this particular case, the ship being sent on an official mission of the highest level, we may assume that the crew had been brought up to standard to make the ship as impressive as possible (cf. Xen.*Oec.* VIII 8).

[2] Basch (1987: 304.1) indulges in that speculation: he rashly includes Egyptian contingents, but omits the Mytilenaians, the only certain non-Phoenician

The next mention of the Persian navy, which introduces its post-525 history, is made in an off-hand way by Herodotos after describing the conquest of Samos by the Persians in *c.* 517 (for the date see Busolt 1895: 513 and n.3, 523 n.1). We learn then that the Babylonians seceded at the moment the naval expedition for Samos (which Herodotos first describes without breathing a word about its naval character) had departed for the attack ('Επὶ δὲ Σάμον στρατεύματος ναυτικοῦ οἰχομένου: III 150.1). Herodotos is silent about the place from where this expedition started, but, contrary indications lacking[3], it seems safe to assume that the fleet employed was the fleet 'dependent on the Phoenicians' (19.3) which Kambyses had used against Egypt. The fact that this fleet evidently met with no opposition from the side of the Samian navy is unexpected in view of Samos' naval prominence under Polykrates: possibly the Persian operations started with a surprise investment which made the use of the Samian navy impracticable, such a surprise being feasible for a fleet coming from the East and the South[4].

Some years later two triremes, which surely belonged to this fleet and may have had their home port in Sidon, are said to have accompanied the sailing ship on board of which 15 Persian grandees under the guidance of the Krotoniate doctor Demokedes reconnoitred the Mediterranean all the way to southern Italy (Hdt.III 136.1ff.). This reconnaissance is most likely to have been undertaken to ascertain what naval potential was present in the Greek world outside the empire[5]. If so, it was due to the same strategic forethought that led to the similar reconnaissance of the Indian Ocean by Skylax of Karyanda[6].

---

contribution to Kambyses' fleet.

[3] The commander, Otanes (one of the Seven: a sign of the importance attached to this undertaking), is merely said to have gone down to 'the sea': this *may* be a term for the Persian naval establishment in Cilicia (see Wallinga 1991: 278f.) and there to have raised the expeditionary force (Hdt.III 141). In the circumstances of the preceding 'civil' war in the Persian empire, Kambyses' navy can hardly have been enlarged already at that moment by the addition of an Aegean fleet, nor is it probable that the Ionian subjects were mobilised for the action against Samos.

The naval character of Otanes' expedition is often ignored: see e.g. Shipley 1987: 104 and Young 1988: 67. Sealey mystifyingly calls it 'a special force' (1976: 174).

[4] The islands to the South of Samos afforded cover for much of the last part of the route. But it is also far from impossible that Polykrates' naval policy had been given up under Maiandrios and that the Samian navy, much reduced in strength anyway since 525, was not in readiness.

[5] Murray's view (1988: 465)that the reconnaissance is a sign of Darius' interest in western expansion and that the Persians were sent 'to map the coasts of Greece and Italy' (a palpable anachronism) is typical of the approach of *CAH* IV^2.

[6] See Wallinga 1987: n.44. It is true that this strategic motive probably was not mentioned by any of Herodotos' informants, but then that is hardly to be expected since none of them was sufficiently high up to know what exactly had motivated

Later again a navy of 600 ships[7] is said to have participated in Darius' Skythian expedition, although understandably no naval action is recorded for this fleet: the Skythians having no naval arm, the ships were merely used to bridge the Danube (Hdt.IV 87.1 and 89.2). They are said to have been brought up by Ionians, Aiolians and Hellespontines (*ib.* 89.1), though it is suggested that the other coastal subjects also contributed (in the assertion that Darius led out 'all the races over which he ruled': *ib.*87.1). This cannot of course be taken to mean that 'there were Phoenician, Cypriot and Egyptian squadrons as well as a Greek squadron' (Fol, Hammond 1988: 238): in Herodotos' description of the events there is no trace of such squadrons. At the same time (or perhaps somewhat earlier) another, far smaller, fleet—consisting of 30 pentekontors—under the Kappadokian satrap Ariaramnes performed a raid on Skythian territory with the purpose of taking captives (Ctes. *FGH* 688 F 13.20[8]). The use of the term pentekontor by Ktesias makes this fleet far more interesting than would have been the case had he used *naus* or *triêrês*. For with this specific term the report has a good chance of being based on serious tradition, the use of pentekontors, i.e. auxiliary ships[9] furnished as such by subject *poleis*, being dictated by the absence of bases of the Persian navy in the Black Sea area.

In the year 500, when Naxian aristocrats tried to find support in

---

Darius (and his model Necho: Hdt.IV 42.2) to send out such expeditions. It is striking that the advisers of a later potentate immediately thought of this strategic context when they were told of an expedition that was outwardly similar (see Strabo's report on the confrontation of Eudoxos of Kyzikos with king Bocchus of Mauretania: II 3.4 C100).

As to Demokedes' voyage, I feel certain that it is historical in substance, though I readily accept that the story Herodotos heard had already been much embellished in the telling: see the exemplary analysis by Griffith, 1987.

[7] Of the three Persian fleets numbering 600 ships (the others are the fleet of the battle of Lade and that of the Marathon campaign, both consisting of triremes only: Hdt.VI 9.1 and 95.2) this will have been differently composed and have comprised both royal triremes and pentekontors furnished by the subjects, just as both these types were used to bridge the Hellespont in 480 (Hdt.VII 36.1). Herodotos' account does not at all imply that the entire trireme fleet of the Levant was directed to the Euxine. If the figure of 600 can be trusted (it seems the most doubtful of the 600's to me), it shows to what extent the Persian naval staff thought in terms of 300's.

[8] There is no reason, certainly not in Photios' rearrangement of Ktesias' text, to make this expedition a 'reconnaissance in force' (so Fol, Hammond 1988: 240). Since its character evidently was wholly different from that of Darius' own undertaking, such a view is most improbable: also a fleet of 30 pentekontors is ridiculously small by this time for the reconnaissance 'in force' surmised. It is much more likely that it was a diversion.

[9] Thiel's terminology for the allied contribution to Roman sea-power (see 1954: Index *s.v.*). Note that in Xenophon's time Trapezous still used pentekontors (*An.* IV 1.15).

Miletos for the coup they wanted to carry out against the democratic régime in their *polis*, the Aegean fleet of the Persian navy made its first appearance as such. In Herodotos' account of the discussion between Aristagoras of Miletos and the Sardian satrap Artaphrenes about Naxos, it transpires that the latter was willing to muster a fleet of 200 triremes (Hdt.V 30.5, 31.4, 32) out of his total strength of 300[10]. It was the mobilization of this fleet against Naxos that gave the Ionians the opportunity to seize all the 300 Persian triremes and to begin the revolt that also involved Athens and Eretria. At the mention of the participation of these two *poleis* in the Ionian attack on Sardis Herodotos specifies the Eretrian squadron as consisting of five triremes (V 99.1), the first certain referral to this type in action outside the sphere of the eastern kingdoms. By implication he also characterizes the Athenian squadron of 20 'ships' as consisting of pentekontors and long vessels (cf.Th.I 14.1).

Here I must stress that there is only indirect evidence for the hypothesis just put forward that the original 'Ionian' fleet did not include ships that had been built as *polis* property, let alone naukraric ships. In the first place Thukydides' finding that only following the Corinthian apogee Ionians, i.e. Samos and Phokaia, gained a powerful position at sea (I 13.6), and that these three *poleis* were the mightiest sea-powers. This verdict could not have been expressed in that way if there had also been powerful navies of Miletos, Chios and Lesbos (as the distribution of the Ionian ships at Lade over the *poleis* has been taken to signify: Hdt.VI 8). These navies are indeed conspicuous by their absence in the tradition. Analysis of the whole of Thukydides' account of the genesis of Greek sea-power leads to the conclusion that the three Greek sea-power he does mention were the only ones of their kind and that the average Greek *polis* navy was of the class of the very small ones of Aigina and Athens (see p.22). Consequently, the Ionians' possession of more than 300 triremes in 494 in combination with the predominance of the number of 300 in the naval record of the Persian empire very strongly suggests that 300 of their triremes were in fact Persian ships which the Ionians appropriated at the beginning of the revolt—200 are expressly described as such by Herodotos (V 30.5)—and that the Ionian cities built 53 in addition to that number during the revolt[11].

---

[10] See Wallinga 1987: 68-69. Herodotos' description here contains no element that suggests that these 200 triremes were the ships belonging to the Greek cities of Artaphrenes' satrapy, as has always been asserted (e.g. Murray 1988: 473). On the contrary: if that was what Herodotos wanted to describe, his Aristagoras would not have told the Naxian conspirators that it was Artaphrenes who had (a large army and) many ships (Hdt.V 30.5).

[11] See Wallinga 1984: 429ff. (if they had not been taken from the Persians in

During the Ionian revolt itself the Levantine fleet of the Persian navy first came into action against the Cyprian insurgents and their Ionian allies. A Persian army was transported from the great naval base in Cilicia to Cyprus (the neighbourhood of Salamis) and the Phoenician crews then brought the ships[12] round the 'keys' (= mod. Cape Andreas), i.e., to the north coast of the island, to waylay (or be waylaid by) a Ionian fleet which had been summoned by the Salaminian tyrant Onesilos (Hdt.V 108.2). Concerning these fleets and the battle which ensued and which was won by the Ionians, Herodotos (V 112.1) gives no details at all, except that he mentions that the Samians won the prize for valour. Still we may be certain of the magnitude of the operation: a fleet that could transport a sizable army (plus siege apparatus!) and then, in the same breath, risk a sea-battle must have been of considerable size. The standard strength of 300 triremes can therefore be assumed, half or two thirds of the ships counting as ships of the line (see p.184ff.).

The very scanty information on the naval operations of the Ionian revolt, and on this battle in particular, is supplemented in a most intriguing way by an author who was quoted by Plutarch (*Mor.* 861B-C = *FGH* 426), but is otherwise unknown. This is Lysanias of Mallos in Cilicia. Lysanias asserted that a sea-battle took place in the Pamphylian Sea between the Eretrians and a royal Persian fleet coming from Cyprus[13], which ended in a Persian defeat. This piece of information, which does not conflict with Herodotos and therefore is potentially important, is framed in other assertions which in combination with it and with each other make for a story that is wholly irreconcilable with Herodotos. Whereas Herodotos dates the sea-battle to about a year after the beginning of the revolt (V 116: Κύπριοι μὲν δὴ ἐνιαυτὸν ἐλεύθεροι γενόμενοι ...), Plutarch's text makes it take place at a moment when the affairs of the Ionians were in jeopardy and the Persian siege of Miletos had already begun. One must hope that the mess is due to Plutarch

---

the sea-battle near Cyprus to be mentioned presently).

[12] Herodotos clearly says that the Persians crossed from Cilicia in ships and that the Phoenicians rounded the Keys in *these* ships (V 108.2: τῇσι δὲ νηυσί, see Van Groningen's comment). Macan's speculation about two fleets misses the point. This passage incisively illustrates the *two* functions of the trireme.

[13] The mss. of Plutarch (see Pearson's edition in the Loeb Classical Library) have the following text: '... στόλου βασιλικοῦ προσπλέοντος ἀπαντήσαντες (sc. Ἐρετριεῖς) ἔξω Κυπρίους ἐν τῷ Παμφυλίῳ πελάγει κατεναυμάχησαν'. The Byzantine scholar Pletho paraphrased a text that evidently was different: 'στόλῳ βασιλικῷ ἐκ Κύπρου τῇ Ἰωνίᾳ προσπλέοντι ἔξω ἐν τῷ Παμφυλίῳ πελάγει ἀπαντήσαντες κατεναυμάχησαν'. This paraphrase makes much better sense, hence I have taken it as my guide. It is of course to be understood that the Eretrian fleet mentioned here need not be the same as the five triremes of Hdt.V 99.1.

himself, but if it is the fault of Lysanias, his testimony—although devalued—does not lose all its interest. The fact that he uses the term 'royal fleet' (βασιλικὸς στόλος) may be taken as an indication that this Cilician, who came from the direct neighbourhood of the Persians' central naval base (the Aleian Plain: see Wallinga 1991: 280), preserved local knowledge about the Persian naval organization, like Ephoros preserved Kymaian tradition in this field[14]. It is a great pity that the unfortunate manner of Lysanias' survival makes his testimony so difficult to evaluate.

The naval defeat referred to by Herodotos and Lysanias made the Persian losses in the first phase of the revolt considerable: they must have been well above the 300 triremes seized by the Ionians at the beginning of their insurgence (and may have included all, or part of, the 53 they had above that number at Lade). When therefore in 494 the Persian navy assumed the offensive and appeared in the Ionian waters with 600 triremes, a period of great building activity must have preceded, presupposing not only facilities and personnel, but also financial means. Clearly Darius' financial organization gave the king enough elbow room to make this possible, notwithstanding the loss of the Ionian tribute[15]. Still it may seem surprising that the naval forces were not used more often, let alone continuously. In my view this illustrates the crucial difficulty of the use of ancient navies, viz. that the exploitation of the ships, in particular the pay of their crews, was far more expensive than the ships themselves[16]. This must be the reason why the ample naval potential that was seized by the Ionians was not used at all except for the action just described and the final battle itself: not even cities like Klazomenai and the naval base Kyme could be protected against

---

[14] See p.118-119. Alternatively one could explain the similarity in terminology to the direct influence of Ephoros (a possibility which escaped Jacoby: *FGH* 426 comm.). But I prefer the other view, also because Lysanias' interest in Eretria, with its 'lokalpatriotische' overtones, may be explained as fired by local Malleote tradition about this sea-battle.

[15] Assuming, as I do, that Darius' fiscal organization of the empire had been chiefly devised to finance the naval forces and their infrastructure, and that from the time of its establishment no great expenditure had been incurred (the Naxian expedition being of modest size compared with the overall strength of the navy), I would expect that there was a financial reserve available.

[16] For this reason Athens during the Peloponnesian war had far more ships than were ever used at one time. For the same reason the tradition that the Spartans at the beginning of this war were planning to build (or rather to order the building of) 500 triremes (Th.II 7.2) must be considered less absurd than it is often made out to be (see e.g. *HCT* II 7), although Thukydides' informants no doubt were too optimistic (for the cost of construction and exploitation of triremes see p.125f. and p.153f.).

Persian attacks, a glaring contrast with the situation after 479 when the Persians did not so much as try to retain Kyme, let alone other cities.

The tradition concerning the battle of Lade invites comment in the same vein. When the Persian commanders were informed of the Ionian strength of 353 triremes they were in doubt whether they would be strong enough to overcome them (Hdt.VI 9.1). This may signify that very many of their 600 ships had come with skeleton crews, i.e. as reserves, a regular trait of naval operations in time to come (see p.174-175)[17]. What is also noteworthy about this fleet is the very long service of at least some of the ships and crews. Herodotos makes the fleet winter around Miletos and thereafter has the ships participate in operations that may have taken a good part of the year 493 (VI 23, 25, 34, 41). His use of the term 'Phoenicians' suggests that the ships used were still manned by the crews that had brought them up from the Levant. Since Phoenician oarsmen will have been mostly professional sailors, such long service would have been a very heavy burden for the cities concerned. I have little doubt that all this naval activity cannot have involved more than a fraction of the crews that brought the ships to Lade. After the battle the Levantine oarsmen must have been replaced with Aegean personnel (how helpless oar-crews were in the confrontation with alien marines is drastically illustrated in an incident of the battle of Salamis: Hdt.VIII 90.2), though not on a lavish scale. Since Ionian sea-power had just been eliminated there was no need for that.

The Persian drive to reconquer the European possessions (see Will 1972: 93f.) led to the expedition under Mardonios, which started out in Cilicia and is described as large, both in troops and in ships (Hdt.VI 43.1-2). These forces went on to the Hellespont separately, Mardonios travelling there by ship[18]. No grand total is given for the ships, but it is twice said that there were many (πολλὸν δὲ ναυτικόν and χρῆμα πολλὸν νεῶν: *ib.* and 43.4). It is not made clear what function the ships were to have, whether they came as transports or as ships of the line (that they were used to ferry the troops over the Hellespont does not of course exclude the latter alternative). When this fleet was shipwrecked

---

[17] The fear ascribed to the Persians may also be a speculation thought up to explain the delay of the Persian attack: this delay, which is implied in Herodotos' report (VI 9.2ff., 11.1ff.), may have well been caused by Persian hopes that the Ionian fleet would disintegrate for want of sufficient finance (which eventually it did).

[18] Herodotos of course implies that these ships were 'furnished' by the Levantine subjects. There is no indication whatever that 'Mardonios and his army were carried over to Thrace in Ionian ships' as is asserted by Young (1988: 69), who thus suggests that the Persians were thorough military idiots in leaving important naval forces in the hands of freshly subjected rebels.

off Athos, 300 ships and 20,000 lives are said to have been lost. This 'might be taken to imply that the forces of Mardonios amounted to the regulation 600 vessels'[19], but the figure of 300 simply is too round to be true[20] and together with the rough assessment of the human losses just quoted demonstrates that the tradition was rather vague where this fleet was concerned[21]. And this vagueness in itself surely ought to dissuade us from accepting estimates as that just quoted: Mardonios had no reason to expect naval resistance of any consequence, for only Thasos possessed a navy in these waters (and that probably only in statu nascendi: see p.142 n.37). That is to say that here a fleet of 300 triremes would have been very large indeed. Whatever its precise size, it was large enough to overawe the Thasians (Hdt. VI 44.1) and will no doubt have contributed to the recovery of the Greek coastal cities and the Pangaion area.

In 490, finally, the full force of the Persian navy was felt in the world of the European Greeks, when a fleet of 600 triremes took part in the campaign under Datis and Artaphernes, which culminated in the battle of Marathon (Hdt.VI 94ff., the expedition described in 95). Evidently the triremes of this fleet[22] were chiefly used as transports (see

[19] Thus Macan at Hdt.VI 44.3, adding 'and to some 200,000 men', which at 333 men per ship is utterly fantastic.

[20] Herodotos' unexpected and unwarranted verdict that the result of this expedition was a disaster or even a disgrace (αἰσχρῶς ἀγωνισάμενος: VI 45.2, cf. Macan's commentary) suggests that the tradition is badly distorted.

[21] The 20,000 men are perhaps more promising as a basis for reconstruction, either on the assumption that the figure implies one hundred full crews of 200 men (cf. Hdt.VII 184.1), and so the loss of 100 ships (and an original strength of 300?); or, less plausibly, that the triremes were transports with crews of upwards of 50 oarsmen and the loss indeed some 300. But the exercise does not seem worth the effort: the figures look mere calculations.

[22] According to Blackman (1969: 181) 'Ionians and Aiolians, and perhaps Hellespontine Greeks, must have provided ships in 490', but this is against Herodotos' description of the beginning of the expedition: *all* the ships assembled in Cilicia and this should mean that only Levantine ships, or rather crews, were mobilised. The use of Ionian, and generally Greek ships against Greeks so soon after the Ionian revolt seems very improbable to me (the completion of defective crews with Greek oarsmen is another matter). Herodotos describes the expedition in a way which suggests that this total of 600 triremes also comprised the horse transports: when Datis' army was encamped in the Aleion pedion the whole naval force also gathered there including the horse transports; when the horses and the foot soldiers had been put on board 'they proceeded in 600 triremes to Ionia' (VI 95.2). This is by no means to be excluded: if the horse transports were altered triremes, as they were in the later Athenian navy (and how could they be anything else?), they could be considered 'triremes' just as well as the troop transports in the Sicilian expedition (see Th.VI 43 and p.175). There is by the way no reason for Hammond's grotesquely anachronistic, and technically (for wooden ships) quite impossible, idea that 'the transports *evidently* <my italics> had let-down flaps for landing horses and men', i.e. were specially designed landing craft (1988: 504,

Macan 1895 I: 350 n.10), i.e., they had crews not necessarily larger than some 50-60 oarsmen on an average (see p.171f.). Their assignment was not only to bring the troops from Cilicia to the Aegean and back, but also to transport victuals and to carry off captives—Naxians, Eretrians and Athenians—back to their base (whence they were to proceed to the royal residence)[23]. Since Herodotos gives no figures at all for this expedition except for the triremes, we can only speculate about the number of combatant forces—infantry and cavalry—and non-combatants (guard troops in any case) on board, but there can hardly be any doubt that this was in the words of Will 'une armada trop modeste pour viser la "conquête" de la Grèce', and its task not much more than 'd'établir partout des régimes vassaux' (1972: 96), including the reinstatement of Athens' ancient tyrant Hippias (although to call it 'a small amphibious force'[24] is wholly to lose sight of the realities of the situation). Even if the combatants are put at no more than 20,000[25] and the non-combatants at 4000, the total number of men, including 600 x 60 oarsmen and at least 6000 sailors, still would far exceed 60,000[26] and that on any count means

---

endorsed by Young, *ib.* 70).

[23] Naxians found in the city were enslaved (Hdt.VI 96), but are not mentioned among the captives conveyed to Persia with the Eretrians (*ib.*119), an obvious oversight *pace* Balcer (1989: 132). How many Athenians and Eretrians the Persians had expected to carry away must of course remain a matter of speculation, but Nenci's view that the deportation of the populations of Athens and Eretria was 'perfettamente attuabile' (1958: 40) for the Persians is perfectly baseless.

Victuals are seldom considered where this expedition is conncerned. A sufficient supply is of course to be assumed, since Herodotos has preserved no evidence to the contrary. The occupation of Naxos and Eretria and the plundering of Karystos will moreover have yielded supplements and it is not at all to be excluded that a number of triremes was employed in bringing up new supplies from Ionia, precisely as the Saïte kings had used their big galleys in provisioning their Syro-Palestinian allies. Balcer has the merit of having given thought to this matter, but his expedient of reducing Datis' naval strength of 600 triremes to 'one-half to one-third of that reported' as 'more realistic', and then censuring him for having 'relied upon perhaps two hundred ships for all supplies, food, water, cavalry supplies, and equipment' (1989: 131) condemns itself.

[24] Starr (1989: 29) does not elaborate, hence his assessment is unintelligible, but I have no doubt that it is very wrong.

[25] This is the figure assumed by Hignett (1963: 59) for 'the total Persian force which took part in the battle' of Marathon; Hammond (1988: 504) raises this to 'at least 25,000 infantry', both reasonable guesses, especially if the non-combatants are to be assumed included in the 25,000.

[26] Hammond's calculation—amounting to 90,000 (1988: 504)—is a model of arbitrariness. He reduces Herodotos' 600 triremes to 300 because 600 is a 'conventional' figure; he prefers Plato as a historical source (*Menex.*240a7 has 300), though he suppresses the total of 50,000 men Plato also mentions; he supports his own total of 90,000 by drawing attention to a quotation in Ailios Aristeides (II 511), which is ascribed to Simonides by Aristeides, but has not been accepted as genuine by all modern editors, and which Bergk and Diehl severely emended to make it

a huge operation, especially in relation to the scale of the Greek communities and their military establishments. Herodotos' reticence concerning the numbers involved is for that reason very curious[27].

The strength of this 'armada modeste' can safely be assumed to have been carefully calculated: 600 transport triremes could be transformed into 200 or 300 ships of the line by concentrating the crews (see p.182) and such a battle-fleet could be considered adequate against all possible Greek comers. We have, of course, no adequate means of assessing the total strength the threatened *poleis* could put into the field, but even if they could muster 250 ships—an optimistic estimate in my view[28]—these were predominantly pentekontors and assorted merchant galleys (Th.I 14.1; see p.63f.) and so no match for an all-trireme fleet. In the actual operations the fighting potential of this fleet was not put to the test, for none of the *poleis* attacked could mobilize its naval forces. The tradition evidently did not preserve any memory of such a thing being proposed or even contemplated. This, by the way, confirms (and will have been one of the reasons for) Thukydides' judgment that it was only after Darius' death that Greek *poleis* began to adapt their navies to the scale of the Persian naval arm by increasing the number of their naval ships and introducing the trireme (I 14. 2-3).

What seems to me most striking in the Greek traditions just treated is

---

acceptable to them. Aristeides' quotation is an alternative second line of the well-known epigram Ἑλλήνων προμαχοῦντες Ἀθηναῖοι Μαραθῶνι / χρυσοφόρων Μήδων ἐστόρεσαν δύναμιν (90 Bergk; 88a Diehl; XXI Page), viz. ἔκτειναν (ἔκλιναν Bergk) Μήδων εἴκοσι μυρίαδας (88b2 Diehl). Diehl follows Boas (comparing Justin II 9.20) in preferring the reading εἴκοσι of the scholiast to ἐννέα of the Aristeides mss., but does not even mention Bergk's emendation). Of course Simonides' more than 200,000 (or even 90,000: note that the number refers to combatants!) are totally incompatible with 600, let alone 300 triremes (to which Hammond adds 'transport and supply vessels' that no source mentions).

[27] It is almost unavoidable to infer from his assessment of the crews of Xerxes' navy (VII 184.1) that he would have put Datis' crews at 120,000. His silence probably signifies that his informants also were silent on this aspect of the expedition, which must mean that the tradition about Marathon was not as embellished as that about '480'. For this reason the one figure transmitted gains in respectability. Herodotos' silence may well imply that no one of his Athenian informants had actually seen Datis' 600 triremes, the greater number of which may indeed have stayed behind in Naxos, Eretria and Karystos, insofar as they were not engaged in provisioning the army.

[28] Athens some 50 ships—or, if the 20 had already been 'bought' from Corinth (Hdt.VI 89), 70—including one or two triremes (see p.142 n.36); Corinth and Eretria at most a comparable number with more triremes than Athens; Naxos the same again (?: see Hdt.V 30.4); some smaller allies. But of course an alliance was only conceivable in theory, and the Persians did everything they could to ensure its frustration: this was no doubt the objective for which the heralds had been sent out in 491 (Hdt.VI 48.2).

that the record of the Persian naval undertakings, involving as they did the mobilisation of enormous fleets for which there were no precedents and certainly no equivalents in the world of the archaic *poleis* (Greek or Phoenician), is presented in so matter-of-fact a manner. There is none of the sensationalism that disfigures the tradition concerning the Persian land forces under Xerxes. This restraint in my view implies that Persian policies in the coastal areas were considered moderate and in fact did not lead to provocative flag-showing, nor to any panic among the Greeks. That this was the view of non-subject contemporaries (though after 480 things were understandably seen in a very different light) follows from the tradition about Themistokles' naval bill. If in 483 it was possible in Athens to discuss that explosive proposal without any thought of the possible Persian reaction (Hdt.VII 144.1 and especially Plu.*Them.*IV 2: see p.158), the building of triremes by Greek *poleis* before 483 cannot have been the result of a panic as was implied by Eduard Meyer (1939: 291ff.). Ehrenberg's observation (1976: 145) that 'the Greeks were acting in these years (about 488-484) as if there was no possible threat of a new Persian attack' is entirely justified[29].

2 *The first triremes in Hellas and the Persian reaction*

Thukydides asserts that Corinth was the first *polis* in Greece where triremes were built (I 13.2: ... τριήρεις πρῶτον ἐν Κορίνθῳ τῆς 'Ελλάδος ναυπηγηθῆναι)[30]. This ought to mean that Corinth had triremes well before 499—that is: before Eretria had them—and this is not improbable. For even if the creation of the Persian navy of triremes in 525 and the establishment of its Aegean fleet after c.515 failed to perturb the free

---

[29] There is a curious ambivalence in Eduard Meyer's assessment of Persian policies under Darius. On the one hand he expresses the idea that after Darius' reunification the empire ceased to be an 'erobernder Staat' and restricted itself to no more than 'auszubauen, abzurunden und das Gewonnene zu behaupten'; on the other he censures Athenian self-assurance in the face of Artaphrenes' order to reinstate Hippias: 'wer tiefer blickte konnte schon jetzt nicht mehr verkennen daß am politischen Horizont eine Wetterwolke aufzog, wie sich noch keine über Griechenland entladen hatte' (1939: 23 in contrast with 1936: 743). One may well ask if this ambivalence is not due to the same feeling as Ehrenberg's. Meyer's notions clearly have been influenced by Curtius who also ascribed to Darius the 'Gesichtspunkt das Reich abzurunden' (1878: 602).

[30] As I have explained earlier (see p.31), I think that Thukydides' wording here indicates that he (or possibly already his informants) distinguished the 'invention' of the trireme from the introduction of the type in the navies of Hellas. For Thukydides the invention was outside his purview: what interested him was the second aspect and here his informants clearly were unanimous about Corinth's lead (but Thukydides' 'λέγεται' signifies that he had not abandoned all reserve: see p.13 n.3).

Greeks, they could not look on passively while Polykrates had the monopoly of these ships in the Aegean and even less while his exiled enemies at Kydonia used their triremes (not *samainai*!) to menace the trade route to Libya and Egypt[31]. *Poleis* with Samian connections or with trade interests in the areas concerned clearly had good reason to build the new type for themselves, especially Aigina: just as the Etruscans and Carthaginians had had to leave the Phokaians alone for five years, the Aiginetans had to wait for the same period before they could seriously contemplate an attack[32]: presumably this delay was needed to accumulate sufficient means for a large-scale and time-consuming operation. In both these cases the reason evidently was the same: the superiority in ships of the opponent. Nevertheless the fact that Thukydides lumps Aiginetans and Athenians together as backward in naval development up to the time of Xerxes' reign is near proof that the Kydonian war did not lead to a radical change in the composition of the Aiginetan navy[33]. Consequently we must assume that the Aiginetans crushed the Kydonian Samians by the method which had been vainly tried against the Phokaians in the battle of Alalia (a vast numerical superiority, which may now have been successful because the technical superiority of the Samians was due not so much to the proficiency of the crews, as it had been in the case of the Phokaians, as to the superior qualities of their ships as such[34]).

Still the *polis* of the Aiginetans may be assumed to have replaced its own pentekontors with triremes and the five Eretrian ones also will have been such recent replacements. On the hypothesis that Corinth's navy of state-owned ships was much larger than the petty ones of Aigina and Athens I would assume that a larger number was involved there, although by insisting that before Darius' death triremes remained scarce in the Greek navies Thukydides suggests that in the first instance this number was not large even here[35]. As far as Athens is concerned there is no reason to suppose that it had more than one or two

---

31 See Jeffery 1976: 217 and cf. p.96 n.77).

32 See Hdt.I 166.1, III 59.2-3 and above, p.8.

33 For Hammond's assertion that Aigina had 'fifty or sixty triremes' already by the time of the battle of Lade (1988: 504) see p.7.

34 Since these technical qualities largely depended on the size of the crews and since Samos is close enough to Crete for any who would to return home, the superiority of the triremes over the Aiginetan pentekontors ship by ship may well have been slight. There is no reason to think that undermanned triremes could not be beaten by a numerical majority of well-manned pentekontors.

35 Herodotos' report on the 'lend-lease' transaction of *c.*490 between Corinth and Athens (VI 89: pp.23 and 26f.), may imply that the Corinthians at precisely that juncture were replacing a series of their pentekontors with triremes.

triremes, if any, before 483[36]. If Herodotos is right in suggesting that at the end of the sixth century Naxos had also become prominent as a naval power (among Greek *poleis*: V 30.4), and if Thukydides is taken to mean that the few triremes he ascribes to archaic sea-powers (I 14.1) were widely distributed, not concentrated in a few *poleis* like Corinth, the inference may be justified that the five Eretrian triremes had their Naxian counterparts.

One other navy may be supposed to have consisted of a relatively large number of triremes, namely that of Thasos after the Ionian revolt. Thasian triremes to be sure are not specified by Herodotos, who merely says that the Thasians built long ships (νέας μακράς: VI 46.2) in response to the naval blockade imposed on them by Histiaios in 494. But when one considers the Thasians' large financial means and in particular the opponent they intended to ward off with their new navy (Histiaios and his triremes: Id.VI 5.2-3 and 46.2), the conclusion that triremes were now built here is almost inescapable. Herodotos gives no particulars as to the planned size of this fleet, nor concerning the progress of the building. Since, however, the Thasian decision was taken during the very last stage of the Ionian revolt and since Histiaios was soon to disappear, the number of ships actually built may still have been small at the moment the Persians took action and enforced the surrender of the new ships[37]. What was done with the ships thereafter is of course anybody's guess: Herodotos perhaps implies that they were put in safe keeping in the Persian naval base at Abdera (VI 48.1)[38]. If the quality of the ships was good, that certainly would have been prudent policy. In that way, moreover, the Thasians could continue to man their 'own' ships in the service of Persia.

The Persian action against Thasos raises the problem of the Persian policy vis-à-vis other 'naval powers' at the maritime borders of the

---

36 Herodotus' report (VI 39.1) that the Peisistratidai sent the younger Miltiades to the Chersonese by trireme, is in my view to be taken seriously (cf. Lewis 1988: 298). I cannot accept V 85.1, however, where a trireme is mentioned in the story of the genesis of the ἔχθρη παλαιή of Aigina and Athens. Hippias' building of one or two triremes would be precisely the reaction to be expected after Polykrates obtained his, but he may well have kept them to himself and taken them with him to Sigeion.

37 There is of course no reason whatever to follow Hammond in assessing Thasos' navy at fifty or sixty triremes, nor, strictly, to call the island 'the strongest naval power in the northern Aegean', as he does (1988: 504 and 494 respectively). Thasos may have been on the way to become a sea-power in 492: that is all we can say.

38 Fol and Hammond assert that Thasos provided ships to its overlord as part of the Persian satrapy 'Skudra' (1988: 248). In the light of Herodotos' testimony this is paradoxical. Do they mean that it is to be rejected?

empire. To judge from the Greek reports of the known Persian actions—the only data available—this policy clearly aimed at eliminating any power that could threaten the Persian naval arm, however indirectly. The intimidation of Thasos and the overrunning of Naxos and Eretria concerned the leading naval *poleis* within easy reach of the empire. At the moment of their elimination these *poleis* certainly were not a direct military threat to the empire[39], but indirectly their nuisance value was great. The Ionian revolt effectively demonstrated how great, but in my view the Persians did not need that kind of demonstration: their willingness to intervene in the internal affairs of Naxos in 500 sufficiently proves that. In this case the Naxian capacity to compete with the Ionians in the trade to the northern Aegean and the Black Sea area, competition which could affect the tributary solvency of the Persian subjects (see Wallinga 1984: esp.419ff.), will have been even more annoying to the Persians than the dangerousness, possibly growing, of their naval forces. The case of Thasos may have been particularly disturbing to the imperial government not only because its financial means were so large, but also because of the island's share in the mining area on the Thracian coast that figures so prominently in Herodotos' account of the Ionian revolt and its preliminaries, including the Skythian expedition (Myrkinos!)[40]. In my opinion the mines in this area were an important reason why the Persians wanted to subject Thrace (see Wallinga 1984: 417ff.). In this case, moreover, the Thasian navy may not have been the only danger in the area.

Herodotos tells us that at the end of the Ionian revolt the 'Phoenician' fleet sent to the Hellespont drove out the dynast of the Chersonesos, Miltiades. Miltiades just escaped, having loaded his belongings on five triremes, one of which was captured by the Persians (Hdt.VI 41.2). Here it appears that the Thasians were not the only Greeks in the northern Aegean to build triremes at this juncture[41]. Because there is no indication that Miltiades had any part in the Ionian revolt itself[42], this naval

---

[39] In this respect Samos, the first Greek naval power eliminated, was in a class by itself, thanks to the backing of Egypt.

[40] See Hdt.V 11.2, 23.1-2, 24.1, 124.2, 126.1 and Wallinga 1984: 421-424.

[41] Lewis suggests that Miltiades already had these triremes when he joined Darius' 'Danube expedition' (1988: 298). This may be conceivable in theory, but it is far more probable that they were built during the Ionian revolt. I feel certain that the Persians permitted none of their subjects the possession of the type, so that Miltiades would have been obliged to surrender the first batch and to build new ones.

[42] I am not aware of any direct evidence that makes Miltiades an active participant in the revolt or even a supporter of the Ionians (thus Jeffery 1976: 105). Not even his occupation of Lemnos and Imbros need be specifically considered an

programme is to be considered as one (important) element in the independent policy that is plausibly ascribed to him (see Murray 1988: 489) and for which he clearly expected the Persians to have no appreciation. Still that is not to say that this policy was exclusively anti-Persian: the Thasians afterwards explained their defence measures as provoked by the aggression of Histiaios (Hdt.VI 46.2) and that may be a large part of the truth. However, the Miltiadean parallel suggests that there was more to it. The Thasian policy may well have been a manifestation of a general policy of consolidation, if not expansion, on the part of the Greeks in this whole area, directed against Ionian claims (Myrkinos) and depredations by Thracians as much as against Persia. But even then the Persians had all reason to feel threatened by it, in any case as long as the Ionian revolt had not been completely suppressed. And even afterwards the Persian apprehensions are understandable enough. In the case of Thasos and other Greeks in Thrace the old Persian claim on the area may be sufficient explanation of their subjection, but it does not explain the emphasis in the tradition on their elimination as possessors of ships and other defenses. This emphasis, in combination with the case of Naxos (and its dependencies: see Hdt.V 31.2), seems indicative of a definite naval policy on the part of the Persians, a policy which aimed at the elimination of anything that could threaten their naval power. I am convinced that this naval policy was recognized for what it was—not unexpectedly—by Miltiades, who after Marathon endeavoured to find an answer to it.

3 *A Greek offensive: Miltiades' gold rush*

If one considers Miltiades' experience, his political and military leadership in a situation very closely connected with the sea and with the Persian empire, his happy escape from the Persians and following return to Athens might be held to inaugurate more serious concern in at least one important *polis* with the political aims of the Persians. This is indeed generally assumed, but in the absence of positive, not to speak of specific, evidence it is impossible to say what difference Miltiades' presence made to Athenian policy-making. For his important part in the victory of Marathon and his tactical advice before the battle can hardly be considered clues to his political and strategical views. The fact that Marathon was a hoplite victory ought even less to be considered such a clue, for the initiative in this campaign was on the Persian side.

'action ... hostile to Persia' (Wade-Gery 1958: 163), if this event is to be associated with the (local) political vacuum of the years 499-8 (*ib.*).

All that the Athenians could do, Miltiades included, was to adapt themselves as best they could to the situation created by the Persian landing. That they then used the best (and only) arm left to them was unavoidable; that they used it so successfully may well have been due to Miltiades alone. There is, in other words, no basis whatever for Eduard Meyer's view concerning Miltiades' political stance in Athens after his return as a champion of the hoplites and opponent of the naval policy ascribed to Themistokles[43]. In fact the only piece of evidence that contains an indication regarding Miltiades' Persian policy is Herodotos' report on his naval expedition in the Aegean that had Paros as its first target. And the message of this event is precisely the opposite of what Meyer imputed to Miltiades.

The Parian expedition (Hdt.VI 132[44]) may be interpreted as the first move of a definitely anti-Persian version of his earlier policy. This time it was directed against the Persian position in Europe. As has been persuasively argued by Will (1972: 100), it more particularly aspired to establish Greek, especially Athenian, control over the Pangaion area, if not over all Thrace. This clearly follows from Herodotos' unambiguous account, which describes the primary aim of the expedition as the acquiring of wealth, more specifically gold[45]; the attack on Paros was subsidiary. Gold definitely points to the North-Aegean mining area and certainly not to Paros. The reason why, nevertheless, Miltiades first tried to extort money from the Parians must have been that the funds furnished for the expedition by the Athenian *polis* were insufficient.

---

[43] See 1939: 294ff., actually repeated by Schuller 1982: 28.

As explained in the Introduction I do not believe (if only because of the Athenians' lack of financial means) that there could have been a discussion about a definite naval policy vis-à-vis Persia in 493, let alone that Themistokles initiated such a policy then. As to what the *archon* of 493/2 proposed concerning the installations of Piraeus, I am convinced that this had primarily the purpose of developing the harbour and also the specific aim of attracting to it what would remain of the trade of Miletos (cf. Boersma 1970: 38 at n.405) and Milesian traders who could not return to their native city, and in any case not to let Naxos have all the benefit of Miletos' elimination. It may also have been motivated by the continuing feud with Aigina: if this now flared up, or threatened to do so (see p.19 n.21), better protection of the navy, and of the naukraric ships based near Athens, was imperative.

[44] The best analysis of the evidence concerning this expedition known to me is that of Develin (1977). With the negative side of Develin's argument I am almost wholly in agreement: where we differ is in the assessment of the importance of Paros in Miltiades' strategy and in that of Athens' capacity to undertake the subjection of the Cyclades on its own (for Miltiades' 70 ships see p.19 n.21).

[45] The terms of Herodotos' description are most explicit: Miltiades promised greatly to enrich (καταπλουτίζειν) his compatriots by bringing them to a place where they could acquire an abundance of gold without any trouble (ὅθεν χρυσὸν εὐπετέως ἄφθονον οἴσονται).

This is only to be expected. Just as Miletos had not had the capacity in 500 to support the Naxian cabal by itself, Athens cannot have had the means to finance offensive warfare at such a distance as was the plan now. Even in 480, when the tables had been turned and a naval offensive against the Persians became practicable, Themistokles had to resort to the same kind of extortion as Miltiades, no doubt for the same reason and purpose (Hdt.VIII 111-112[46]). Archaic *poleis* on their own clearly did not have the capacity for operations on the scale of a big power like Persia. Hammond's account of Miltiades' operation: 'The Athenians now mustered their full fleet of seventy ships with a complement of crews or marines totalling some 14,000 men and provided the funds necessary for their maintenance', which imputes to the Athenians the acceptance of Miltiades' proposal 'to assume the offensive at sea against the island states which had sided with Persia voluntarily or perforce'(1988: 518), not only disregards Herodotos' express statement as to the purpose of the expedition (and exaggerates its magnitude by wrongly assuming that the 70 ships were fully-manned triremes), but fails to explain what ulterior strategic objective was to be attained and how. I am truly amazed that he gives any credit to Nepos' worthless version of this episode (*Milt.* VII, going back to Ephoros in part at least: see *FGH* 70F63), which makes Miltiades *re*-conquer the islands that had supported the Persians: he is said to have conquered them at the same time as Lemnos (Milt. II 5). This is an armchair strategist's fiction if there ever was one! Also it is hardly believable that a man of the stature and experience of Miltiades would have had the illusion that the subjection of, and the resulting hegemony over, no more than the Cyclades (Naxos of course excepted!) was sufficient basis for a confrontation with the Persians, who after their own subjection of Naxos could only consider such a policy as a direct attack[47].

---

[46] Herodotos' assertion that Themistokles started his extortions at the moment the Greeks had decided not to pursue the Persian fleet must not of course lead us to believe that therefore all naval activity had been cancelled for that year: even if the bulk of the ships were demobilized, a number of them must have been kept in readiness, at a moment that is when public funds had long been exhausted (see p.156 n.68). The extortions were a bitter necessity for the Athenians who had used a large part of their reserves on the building of ships (see p.162). Hammond's suggestions (1988: 584) that Themistokles' action is to be transferred to 479 and that it was inspired by personal greed are entirely gratuitous, and implicitly rejected by himself when he suggests that this action was inspired by Miltiades' strategic concept (*Ib.* 518). This certainly is much the better view.

[47] A view comparable to Hammond's is presented by Musti, who asserts that Miltiades 'riuscì nelle Cicladi occidentali <an entirely groundless assertion!>, ma andò ad urtare contro la resistenza di Paro, rimasta fedele ai Persiani' (1989: 286): Ephoros and Nepos are far less specific. But Nepos' testimony has to be rejected in

What Miltiades proposed to do must have been very similar to Polykrates' continuation of Amasis' anti-Persian policy on his own account: Polykrates also had been compelled to use extortion (Hdt.III 39.4) and finally had fallen for the lure of a large subsidy (*ib.*122.3-123.1; see p.100f.). This demonstrates that contributions by third parties, forced or otherwise, were the only quick way to overcome the infrastructural shortcomings of even the larger *poleis* when embarking on large-scale naval undertakings. For *poleis* with important commercial activity, which could not permit themselves the alienation of potential partners, a five-year wait (= preparation) was the alternative, witness the Etrusco-Carthaginian alliance against the Phokaians and the action of Aigina against the Samians of Kydonia .

It is easy to understand why Miltiades could not choose this alternative: there was no time to lose. In 490 there might still be a chance to dislodge the Persians from their barely rewon positions in Thrace. Local Greeks and Thracians could be expected to collaborate with their former fellow-countryman now that the victory of Marathon had won him such a great reputation. A five-year wait would certainly weaken the effect of that glorious triumph and would give the Persians the time to consolidate their positions[48]. Whether these momentary advantages would have been sufficient to give Miltiades a chance against the empire is of course another matter, but one should beware of denying the possibility out of hand. It would largely depend on the scope of his plans. The north alone might well be too weak to stand up to the empire, but if support—financial and military, voluntary or at the sword's point—could be found among the *poleis* of the southern Aegean, a position like that of Polykrates, Thracian gold and silver replacing Amasis' subsidies, must have seemed attainable. The determined resistance of the Parians and moral, if not actual, support of the Persians (cf. Nepos, *Milt.* VII 3-4) frustrated this grand design and caused the ruin of Miltiades himself. The outcome must have been very reassuring to the Persian authorities in Sardis. It proved that the *poleis* of continental Greece, however troublesome they might be, could not yet be considered really dangerous, chiefly because they did not possess sufficient means, nor

---

any case (see p.148 n.49).

[48] The Persians may have regained important positions in 492, but will have needed far more time for consolidation. This vital aspect of all conquest is often insufficiently envisaged (see Hammond 1988: 496, who optimistically thinks that 'when <Mardonios> withdrew in 491, he left a well-ordered and prosperous satrapy': truly a miracle!). It seems more.probable that it took the Persians far into the 480's to fully re-establish their position and that this was one of the factors that decided Xerxes on the expedition of 480.

the organization to procure the means, for the long-term naval operations any confrontation with the Persian empire would involve.

Miltiades' venture had aimed at curing for Athens' benefit the one fundamental weakness common to all *poleis* in the confrontation with Persia. As I suggested, the chances of the venture as a whole depended not only on success on this particular score, but also on the involvement of other *poleis* than Athens. I would assume that Miltiades' concept included this aspect, but the poverty of the tradition excludes certainty[49]. By any account Herodotos' failure to mention it is an important indication that it did not figure conspicuously in the traditions. This fact should dissuade us from making such simplistic assumptions about the policies involved as Hornblower's Athenian 'attempt to move on to the offensive against Persia after the defensive stand at Marathon' (1983: 32). A direct offensive against Persia was unthinkable without very numerous allies. No doubt Miltiades' plan was anti-Persian, but it was far from initiating 'the offensive' against the empire. For this its immediate scope was far too restricted. As we shall see, the traditions concerning the discussion that led to the passing of Themistokles' navy bill confirm that such concepts were very far from the minds of Miltiades' contemporaries.

4 *Themistokles' navy bill*

The financial deficiency Miltiades had vainly tried to compensate for was suddenly wiped out when in 483 it became known that, thanks to a rich strike, the yield of the dues the Athenian *polis* claimed on the operation of the silver mines in the south of Attika had multiplied. A debate was then started by Themistokles on this 'surplus' (Arist.*Ath.*XXII 7), which otherwise would have been distributed among the citizens. Themistokles managed to prevent this happening and to have (part of) the money earmarked for the building of an unprecedented number of triremes and/or to have one hundred talents deposited with the hundred richest men of Athens, who then had triremes built from this money.

The ancient testimonies for this navy bill are contradictory and this fact has made it one of the thorniest problems of Greek history. Examined closely, the tradition presents three versions of the train of

---

49 One could consider explaining Ephoros' alternative version of Miltiades' objective (above p.146) as the perversion of a tradition that spoke of an attempt to create something like the Delian league, but it is of course much more probable that such a story was fabricated when the league was (or had been) in existence. Nepos' version, in any case, has all the marks of a fabrication (see Dionisotti 1988: 45ff.).

events that resulted in the navy of 200 triremes specified in Herodotos' description of the operations at Artemision in 480 (VIII 1-17, espec.1.1-2 and 14.1). (1) The simplest version is given by Plutarch, who says that Themistokles proposed to build triremes for the money available and that one hundred were in fact built (*Them.*IV 1 and 3). A comparable account is given by Justin with the difference that the ships built number 200 (II 12.12). (2) Herodotos' story is more complicated: it makes Themistokles' proposal concern 200 ships, but adds that at a later moment, when the Athenians were discussing the meaning of the Delphic oracles relating to the situation of spring 480 and when these ships had been built already, others still had to be added (VII 144.1-2). A similar story appears in Nepos: Themistokles first persuaded the people to decree the building of ships, now 100 in number; then, after the discussion of the oracles had led to the mobilisation of the navy, a second lot of 100 ships was added (*Them.*II 2 and 8). (3) An entirely different account is given by the Aristotelian *Constitution of Athens* (XXII 7): here Themistokles does not propose to build ships, but to deposit 100 talents with the 100 richest Athenians, one talent each, and to empower them to spend the money on condition of rendering an account and refunding unwarranted expenditure; on these conditions the money was placed at his disposal and he then had built 100 triremes, each of the 100 depositaries building one of them. Polyainos (I 30.6) has almost the same version, but here Themistokles has no part in the decision to build the triremes, or rather this decision is suppressed: the depositaries simply lay down the ships.

This tradition as a whole[50] is interpreted in very different ways, sometimes without due regard to what the sources say. Eduard Meyer, for instance, suggests that the versions with one hundred ships were the result of criticism of Herodotos' 200 on the grounds that this number 'beim Perserkrieg nicht erreicht war[51] und man überdies die schon vorhandenen Schiffe in Rechnung setzte' (1939: 337 n.1). In thus

---

[50] The evidence can be classed under three or four heads: first there are the recollections of contemporaries collected by Herodotos; then information dug up by Atthidographers as used by the author of Arist.*Ath.*, who (or one of whose sources) is followed by Polyainos; thirdly derivatives of Ephoros' Universal History, which I would suspect in Plutarch (espec. *Them.*III 5, although Plutarch's account as usual is based on many sources, witness e.g. *Them.*IV 2), and Ailios Aristeides (XLVI 187); and finally the solitary account of Nepos (*Them.* II 1-2; 4-8), which must derive from a source dependent on Herodotos. Into Nepos' account a sentence was inserted (II 3), which relates a fictional war with Korkyra and just as fictional fighting of pirates, i.e. does not simply confuse Aigina and Korkyra!

[51] This baseless assertion is slavishly copied by Bengtson (1969: 168; cp. also Wilcken 1962: 139).

reasoning, Meyer implied that Themistokles' bill in fact aimed at 200 ships (including 'die schon vorhandenen'). This view is followed, or at any rate shared, by many others[52]. Others again prefer to follow the versions with 100 ships: Busolt argues that the figure of Arist. *Ath.*XXII 'verdient sicherlich den Vorzug' (1895: 650 n.2) and a similar view is held by Beloch[53], whose choice is explained in his remark that 'die Flotte <of 100 ships!> viel größer <war> als sie für den Krieg gegen Aegina nötig gewesen wäre' (1914: 33; cf. De Sanctis 1961: 24 'un grande naviglio da guerra di 100 triremi'[54]).

The most important contribution of recent years to the better understanding of what happened in 483 has been Labarbe's in his epoch-making *La loi navale de Thémistocle* (1957). What he established is that the traditions refer to two groups of one hundred ships[55], and that for most of our witnesses half the subject is their whole story (1957: 42), so that their versions must be considered to be somehow complementary.

Labarbe explains the dichotomy by assuming that the revenue earmarked for shipbuilding consisted of two separate, but equal sums, one the yield of the district of Laureion (worked since Peisistratos), the other that of the newly-tapped mines of Maroneia: these yields he puts at 100 talents each, each sum used to build 100 triremes (Ch.I: Les revenues des mines d'argent et le nombre des navires en cause). Although Labarbe's effort to prove this thesis is heroic, he can offer no real proof for his explanation: there is insufficient evidence for his neat division of the yields[56]; in particular there is no good reason for the assumption that the building of a trireme cost one talent in 483, on the contrary[57].

Apart from these assumptions Labarbe's argumentation is based on three implicit premises which probably are widely shared, but never-

---

[52] E.g. Grundy (1901: 203), Hignett (1963: 97), Schuller (1982: 28, but cf. 126), Piccirilli (1983: 233-34, cf. 1973: 329) and Hammond (1988: 525).

[53] I doubt if Beloch endorsed the whole of Busolt's argumentation which is as follows: 'denn die Athener verfügten schon bei dem Angriffe auf Aigina über 50 Kriegsschiffe, von denen mindestens ein Teil aus Trieren bestand (Thuk.I, 14, 3), und aller Wahrscheinlichkeit nach haben sie doch in den Kriegsjahren bis zum Erlass des Flottengesetzes eine Anzahl von Schiffen erbaut'. This of course grossly overrates the financial capacity of the Athenian state before 483.

[54] Similarly Burn: 1962: 275-76 and 291ff.; Podlecki 1975: 11; Frost 1980: 81-2; Fine 1983: 292; Musti 1989: 287f.

[55] The objections that can be raised against Labarbe's reconstruction do not in my opinion touch this fundamental fact, but solely regard the explanation he has framed.

[56] See e.g. Lauffer's review in *Historia* VIII (1959), 382-3.

[57] Labarbe treats this problem—essential in his perspective—very much by the way (p.44 n.2). He notes himself that his assessment 'paraîtrait presque trop élevée'. 'Presque' here is redundant.

theless are extremely doubtful. In the first place he assumes that in an archaic *polis* a responsible leader could propose to use a windfall for the building of a colossal number of naval ships without any provision for their exploitation, in particular the payment of the oar crews. In the second place he considers negligible the clear testimony of 'Aristotle' and Polyainos that Themistokles' proposal to deposit one hundred talents with the richest citizens did not contain explicit instructions for the use of that money (see my résumé of their reports at p.149). In fact he corrects the testimony to make it say that the building of ships—what was done in fact—was intended from the beginning, i.e. that even in these versions Themistokles' bill aimed at building 200 triremes. Labarbe's third hidden premise is the most unacceptable of all. He imagines that it was possible in an archaic *polis* to propose the building of 200 triremes without there being a crisis that was in proportion to the magnitude of the building programme, but the absence of such a crisis is explicitly emphasized by Herodotos and Plutarch, and implicit in the rest of the tradition as well[58]: I shall come back to it. Hence he considers himself absolved from the obligation to explain what strategical considerations led Themistokles to bring in such an absolutely excessive bill, and the Athenian assembly, even more amazingly, to endorse it. This crucial problem is totally ignored in *La loi navale de Thémistocle*.

Before I address these fundamental problems myself I want to present in a simple narrative and commentary the progress of the events culminating in the completion of the fleet of 200 triremes specified by Herodotos (and by the Troizen inscription: Hdt.VIII 1.1-2, 14.1; ML 23, l.14), as it can be inferred from the whole of the evidence. First, however, I must say something about our oldest source, Herodotos.

He is at one and the same time our most important informant but also our most embarrassing one. His story, told in the perspective of 480, is that when the Athenians found themselves rich and prepared to share out the windfall, they were persuaded by Themistokles to stop the distribution and to build ships for the money, to the tune of 200. After explaining for what purpose the ships had been built, Herodotos remarks that these ships had indeed been built 'before' (viz. before the crisis of 480 became manifest) and that others then still had to be built. As Macan has acutely remarked (at VII 144.2), Herodotos' added remark 'is a little incoherent in itself, and, if the Athenians had already 200 ships, inconsistent with <his own further> records'. He therefore

58 For Ehrenberg's assessment of the situation in 483 see p. 140. Even Ailios Aristeides V (XLVI 187) and Justin, the only ones to connect the building of the ships with the Persian danger, make this connection a loose one.

proposed to read 100 instead of 200 in the first part of the story and in the second instead of 'others' (ἑτέρας: the ships still to be built) to read 'the same number again' (ἑτέρας τοσαύτας)[59]. That is to say that he wanted to make Herodotos say exactly the same as Nepos (there is no sign at all that he was aware of this). He could indeed have argued that Nepos confirmed his proposal, for the two accounts are very much alike. As Nepos' account of Themistokles' action shows no affinity with any other except Herodotos' own[60], I suggest that it was inspired by a text of Herodotos' different from ours, or by an intermediate authority dependent on Herodotos. This text would have read 100, not 200, as the number of the first-built triremes and would have also specifically recorded the second-instance building of the same number.

Macan's argument clearly impressed Hude sufficiently to propose to expunge διηκοσίας. The figure is certainly embarrassing and Hude's proposal has much to recommend it. I shall come back to it presently. For the moment, I conclude that Herodotos' 200 does not deserve any special respect and that his account is consistent only if the reading was '100', or if there was no figure at all. There is in other words no serious alternative for the traditions specifying 100 triremes as the aim of Themistokles' bill (Justin's '200' must derive from Herodotos). In this perspective we may summarize the content of the sources as follows.

Under the archon Nikodemos—i.e. in the year beginning just before mid-July 483[61] and most probably at its very beginning[62]—the Athe-

---

59 Macan also wanted to rearrange the text by transposing two sentences, reading as a result: 'ἀνέγνωσε Ἀθηναίους τῆς διαιρέσιος ταύτης παυσαμένους νέας τούτων τῶν χρημάτων ποιήσασθαι ἕκατον ἐς τὸν πόλεμον ... ⟨αὐταί τε δὴ αἱ νέες τοῖσι Ἀθηναίοισι προποιηθεῖσαι ὑπῆρχον, ἑτέρας τε τοσαύτας ἔδεε προσναυπηγέεσθαι⟩. αἱ δὲ ἐς τὸ μὲν ἐποιήθησαν, οὐκ ἐχρήσθησαν, ἐς δέον δὲ οὕτω τῇ 'Ελλάδι ἐγένοντο. ⟨ ⟩ ἔδοξέ τέ σφι ...'. Of course, these cavalier proposals can hardly command respect as attempts at emendation, but they demonstrate that there is a serious problem. Hammond's denial that this is a problem on the grounds that 'The Greek of Herodotus is crystal clear' (1982: n.26) is mere obscurantism. The Greek may be clear, but the reporting is defective (if the text is sound), for there is no trace whatever of Herodotos' second batch of triremes above the 200.

60 I strongly disagree with Labarbe's view (p.38) that Nepos' account must be classed with that of Plutarch: this seems to be based on no more than the well-known (and by now wholly outworn) theory of Plutarch's quasi-exclusive dependence on Ephoros. The dependence of Nepos' source on Herodotos is demonstrated above all by what is their common fault, that of absurdly dating the decision to build the second batch of triremes after the Athenian resolution of early summer 480 to fight the barbarian.

61 In 483 the first new moon after the summer solstice fell on the ninth of July (of the Julian year): see Bickerman 1969: 114.

62 I would assume that the surplus had been noticed in the accounts of the outgoing magistrates (thus Labarbe 1957: 107). The decisive argument for dating the bill early, indeed at the very beginning of the year, is that the building of 200

nian authorities assessed the revenue paid (or agreed to be paid) by the operators of the silver-mines and found that there was an important surplus. When it was thereupon proposed to distribute this surplus to all adult citizens, ten drachmas each, Themistokles moved that this money should be used to build a hundred triremes for the war against Aigina, and that a hundred talents should be deposited with the hundred richest citizens, who were authorized to spend the money, provided their accounts would be approved. These men then in fact built another hundred triremes, so that by the early summer of 480 two hundred triremes were ready.

These are the facts in their most elementary form. There is no indication in our texts that 200 talents were involved, as Labarbe has inferred. On the contrary, our authorities state very clearly that the money destined for distribution was to be used for the building of the (first) 100 ships. This implies that the sum earmarked for the first 100 triremes to be built cannot have much exceeded 50 talents (10 drachmae for each of *c.* 30,000 citizens[63]). There is no reason to deny that this is possible, since there is no reason to put the price of a trireme at one talent. This idea has of course been inferred from the testimony of 'Aristotle' and Polyainos[64], but the inference is unsound. For neither says that the 100 talents went *all* into the building of the (second) 100 ships and, although part of that sum was in fact spent on ships, this was not provided by Themistokles' bill, nor is there any need to assume that it was his tacit intention[65]. Themistokles' deposit of 100 talents must

---

triremes between the passing of this bill and that of the mobilisation decree within less than three years is miraculous enough on the earliest possible dating of the bill. Athens cannot be presumed to have had facilities comparable to the all-Italian ones of the Roman republic in 260, when 120 warships were built in 60 days (Plb.I 20.9 and Plin.*Nat.* XVI 192, cf.*HCP* I p.76 at Plb.I 21.3), especially since, as Thukydides implies (I 14.3), the other Saronic Gulf *poleis* were busy building their own triremes so that outside shipbuilding labour cannot have been available.

[63] Hdt.V 97.2; see e.g. How, Wells II 186 and for the number of citizens Labarbe 1957: 200 (cf. Hammond 1988: 525). I reject Labarbe's speculations concerning the growth of the male population of Athens, since they are based on the erroneous notion that triremes always had full crews (see Appendix).

[64] This evidently is the train of thought that led How-Wells (II 186) to say that the sum of fifty talents 'would only suffice to build a fleet of fifty ships'.

[65] It is amazing that the simple statement by 'Aristotle' (*Ath.* XXII 7) that Themistokles 'did not say for what purpose he wished the money to be used' (transl. von Fritz, Kapp 1961: 92) is taken as a sign of secrecy on his part, even to the point of the words being needlessly translated 'he refused to say what he would do with the money' (Rhodes 1984: 65; cf. Podlecki 1975: 202; Rhodes 1981: 278). Since this proposal was part of Themistokles' navy bill, he will have implied that the money would be used for the new ships: here specification would have been difficult because no one could yet say what kind of expenses the actual use of the triremes was going to entail (and there was no need to be specific because funds

have been meant for what was implied in the building programme and therefore did not need specification: the financing of the use of the triremes, i.e. the pay of the crews in the first place. It is only on this assumption that we can consider Themistokles' bill in its full extent a meaningful measure. And if the 100 triremes of the bill could be built for about 50 talents, one must conclude that half the talents of the deposit were indeed used to build the second hundred ships and the other half to pay the crews manning the ships in 480. In other words, this view of Themistokles' navy bill implies that the money available amounted to 150 talents in all. In view of the probability that the mining leases extended over periods of three years (Labarbe 1957: 61) one naturally concludes to a yearly yield of 50 talents over the years 483/2, 482/1 and 481/0. I would assume that the original proposal to share out regarded the yield of the first year only and that Themistokles boldly extended his proposal over the whole period. The extension will have been justified by the necessity of financing the training of the crews, which will have begun as soon as the first ships were ready.

Perhaps there was another reason why Themistokles proposed the depositing of that large future income with rich citizens/trierarchs and authorizing them (conditionally) to use the money. The alternative of paying the crews as they did their stint directly out of the coffers of the *kolakretai* would no doubt mean that at times when training was interrupted large sums were in the hands of the authorities and this carried with it the danger that politicians would propose to use it for another purpose. Themistokles must have wanted to prevent this. His proposal no doubt put the funds effectively beyond the reach of rival politicians and guaranteed that the *polis*' new navy and its new organization would have a smooth start.

Now if the number of triremes in Themistokles' bill was one hundred, it is possible to make sense of his proposal in the strictly Greek

---

not spent, or spent without good reason, would be recovered from the depositaries). For a historian on the other hand, who was reconstructing the course of the events and knew that ships had been built, the lack of any mention of ships in the part of the bill regarding the deposits was something to draw attention to, without implying secrecy.

Perhaps the notion of secrecy has been inspired by the analogy with the bill that enabled Miltiades to mount his attack on Paros: Miltiades also did not say what country he was going to attack (Hdt.VI 132). But even in this case one must be wary of imputing secrecy to Miltiades when he did not specify that country: was there such a 'country'? And could anybody have doubted what was implied in the promise of gold galore? Herodotos' emphasis on this aspect of Miltiades' last action perhaps reflects later comments inspired by the changed practices of the ripened democracy.

context with which our sources associate it. In assessing the desired strength of the new navy Themistokles cannot have simply reckoned with no more than Aigina as Beloch evidently thought (see p.150 at n.53); he must have started from an estimate of maximum enemy strength, in practice that of Aigina and its potential allies. This estimate we must try to approximate, which fortunately is possible. To be sure, we have very little information on naval strengths at the time of this bill except for Aigina itself, and here only concerning its old-style naval arm[66]. We are as ignorant about the friendships and enmities prevailing in the neighbourhood of the Saronic Gulf. But as Corinth is the only *polis* reputed to have had good relations, and even to have been 'very good friends' (φίλοι ἐς τὰ μάλιστα: Hdt.VI 89), with the Athenians, the others will have been potential allies of the Aiginetans. And concerning this very group of *poleis* we know something that in my view makes absolutely clear what kind of calculation Themistokles made.

In 480 these *poleis* had a combined total of at least 99 triremes[67] and this figure, which is practically identical with Themistokles' 100, makes clear what Themistokles reckoned with. Of course I do not want to say that this was the actual strength of the navies in question at the time, nor even that Themistokles was able precisely to prophesy their future numbers, but he clearly was able adequately to assess the naval *potential* of the Saronic Gulf *poleis*. No doubt he will have reckoned with Corinth as a possible ally, and his proposal will have allowed for a margin too, if only because it was desirable, not to say imperative, to have a reserve of ships when operations of a certain magnitude were planned and fitting crews had been hired, so that the expensive hirelings would not be idle if a ship was damaged. Therefore the proposal to build 100 ships is entirely suitable when considered in the Saronic context. The war with Aigina and its potential allies required a fleet of roughly this size and the deployment of such a fleet would require considerable funds. Both were provided for by Themistokles' bill. No additional factors need be brought in as an explanation.

As to the funds, though the amount could simply be what was left

---

66 That is to say the 70 ships mentioned by Herodotos (VI 92) and defined by Thukydides as 'mostly pentekontors and long ships' (I 14.1), no doubt naukraric ships for the greater part.

67 Sparta 16, Megara 20, Aigina 30, Sikyon 15, Epidauros 10, Troizen 5, Hermione 3 (Hdt.VIII 1 and 43-47). See the convenient tabulation in Burn 1962: 382-3. The inclusion of Sikyon, which may seem unwarranted as it had no port on the Saronic Gulf, is justified as Sikyonian along with Aiginetan ships were available to Kleomenes for his attack on Argos in 494 (VI 92.1).

after the cost of construction of the ships had been set aside, the 100 talents may as well be the result of calculation. On the assumption that oarsmen were paid at the half-drachma rate of the mid-fifth century (see p.126 n.57) the 1,200000 half-drachmae would pay a hundred oar-crews of one hundred men (and up to sixty full crews of 170) for four months, and at one third of a drachma a day even for six. In four months such crews probably could be trained to something like proficiency and one large-scale attack mounted on Aigina, in six even more could be achieved. One hundred talents in other words would seem to be nicely commensurate with the operation envisaged[68]. This may well have been the reason why Themistokles extended his proposal over three years.

Ships and money for their exploitation cannot have been all that there was to Themistokles' bill, and to the analogous measures taken in other *poleis.* The transition to Thukydides' modern style of naval power implied considerably more, at least the creation of new officers of the state to command and maintain the ships when in action, and the building of naval yards and harbours; in *poleis* that did not possess silvermines new fiscal institutions, or at least increased public funds, probably both. None of these innovations, however, is mentioned in the tradition, not even for Athens itself, probably because recollection of them was crowded out by the drama of 480. Only for the institution of the Athenian trierarchs has there been preserved an unmistakable indication: in the Decree of Themistokles they are mentioned and their appointment described (ML no.23, 18-22) and there are some possible references in the historians (e.g. Hdt.VIII 87.4, 93.2 and Plu.*Them.*VII 6). It has, for that matter, been long taken as certain that Themistokles' bill

[68] Eventually payment had to be found for crews of twice as many ships as were originally intended and for a period that cannot have been foreseen in 483. In the accounts of the great war of 480 the cost of the war receives very little attention, but some revealing incidents are described by 'Aristotle' and Plutarch: the former tells us that the Areopagos—i.e. all the rich ex-archons—'became the cause of the battle of Salamis' by providing each man with eight drachmas (XXIII 1); Plutarch quotes this story and adds that the Atthidographer Kleidemos denied its truth and made this one of Themistokles' exploits (*Them.* X 6, cf. *FGH* 323F21 and Jacoby's comm.). Plutarch also reports an anecdote about Themistokles and the trierarch of the <*sic*> sacred ship, one Architeles, who already before Artemision had no money left to pay his oarsmen (*ib.*VII 6). Architeles may well have belonged to the second hundred richest Athenians, who served as trierarchs on the second hundred triremes and who had not shared in Themistokles' 100 talents. I would conclude from these anecdotes that there were serious difficulties concerning the pay of the oar crews in 480; that the *strategoi* (specifically Themistokles) and the Areopagos were involved in easing the situation; and that this body afterwards tried to claim the entire honour (see p.163 n.81).

involved the replacement of the *naukrariai* by the trierarchy: 'Die T. wurde durch das Flottengesetz des Themistokles ... eingeführt' (Strasburger 1939: 107) and this hypothesis is indeed plausible. Also, it looks as if the building of a naval harbour for the new navy had been anticipated by Themistokles in 493-492 (Th.I 93.3). However, I have no doubt that Themistokles' earlier proposal can have nothing to do with the fleet of his bill, not even indirectly (see p.145 n.43). The aménagement of Piraeus is indeed not to be taken as a parallel to the building of the navy, as something that was 'just what was needed' for the Great Persian War. Regarding the financial and fiscal innovations, the Athenians were in a situation which radically differed from that of their allies. As to funds, these had simply been thrown into their lap (however insufficient for the whole of the war); fiscal measures were spared them even after the three years covered by Themistokles' law through the creation of a different financial basis for their naval arm in the Delian league. The other *poleis*, with the possible exception of Corinth, had to follow a much more difficult, and for us entirely irretrievable, course.

It is clear that the tradition concerning Themistokles' bill contains an element that was destined to cause the confusion and explains both the modern uncertainty about, and the forced interpretations of, the bill itself and the peculiar variance among our sources. This element is the identity of the figures for ships and talents, which evidently has caused 'Aristotle' (and in his wake Polyainos) to ignore the shipbuilding part of the bill and all the others to overlook the deposit of the talents. The first beginning of the fusion of the two parts is clearly reflected in Herodotos' report, which has preserved the two stages of the building, but already omits the intervention of the rich citizens. For this reason and because the testimonies of Nepos and Plutarch imply the absence of the figure 200 of Herodotos' mss., I would in any case reject this reading (expunging it with Hude: see p.152). Plutarch's version of the tradition, which restricts Themistokles' proposal to one hundred ships, confirms this emendation: Plutarch must have known Herodotos too well to commit the glaring oversight of which he otherwise would stand convicted. If, moreover, Herodotos wrote no more than that 'ships' were built on Themistokles' proposal and that later 'other ships' were added, the neat parting of the traditions is more understandable than if he was as specific as our text makes him[69].

---

[69] Frost's suggestion that 'all our other ancient sources (with the exception of

5 *The 'Persian threat' and the Persian reaction*

And the Persians? As I remarked earlier, the tradition about their naval undertakings before 480 is remarkably free from sensationalism, especially from 'shaking Darius and the Persians <at the Athenians>' as Plutarch puts it (*Them.*IV 2). In thus denying that there was any talk of the Persians, and implying that there was no trace of it in all the literature he had read (and we cannot), Plutarch powerfully reinforces Herodotos, who expressly puts Themistokles' action in a purely local context, inspired not by *the* war, but by a conflict between neighbours. This emphasis in my view implies that Herodotos' informants already had to forestall the natural disposition of their audience (Herodotos himself first of all) to understand 'the war' as the war against the Persians, and that they did this again emphatically confirms that the Persian danger had no place in Themistokles' bill and the accompanying debate[70].

This has seemed unbelievable not only to later Greeks, like Plutarch's source in *Them.*III 5 and Aristeides (XLVI 187), but to whole cohorts of modern scholars. Hindsight has here played its nasty tricks. Still that is not to say that men like Themistokles must be supposed to have defended the navy bill without taking any account of the imperial power at all. Such insouciance, if explicitly ascribed to them by a serious source (*quod non*), would be as unbelievable as Eduard Meyer's *Flottenpolitik.* Even so, in the discussion of the bill the Persians were not explicitly mentioned and this has interesting implications. It must mean that the overwhelming majority of the Athenians were not aware of an acute Persian danger and also that Themistokles and his supporters (*and* his opponents) did not expect that the Persians would be

---

Justin ...) decided to ignore the number given by Herodotus and to accept the number one hundred, whether because of the authority of Aristotle or because this number was given by writers like Ephorus ...' (1980: 82) is tantamount to saying that there is something very fishy about Herodotos' 200!

[70] There is no need to consider such a statement as Thukydides' 'that the Athenians were persuaded by Themistokles, when they were at war with Aigina and the barbarians were expected' (I 14.3) as a counter-indication. Thukydides does not so much describe the situation of the debate, as that in which the Athenian navy—the whole of it—came into being: he is using hindsight. To consider with Frost that his résumé 'sums up the situation' and is 'the true picture'; that the 'Athenians were never unaware of the Persian threat, nor did they care to sweep matters under the rug', and even to say that '*it is certain* <my italics> that in this crucial assembly every single ramification of Themistocles' proposal was discussed' (1980: 83) not only misjudges Thukydides' purport, but takes us much too far away from Herodotos and Plutarch. If explicit statements by respectable sources can be swept aside so radically, the fences are down.

disturbed by the building of a navy of 100 triremes. For both views entirely plausible arguments can be advanced. For the first I have already done so by the way (see pp.140 and 151), but more must be said about the second.

When Themistokles proposed to the Athenian assembly to build 100 triremes, he assumed, as I argued, that Athens' potential opponents in the area of the Saronic gulf were able to build a some what smaller number, say between 70 and 80[71]. Corinth may at that moment have possessed the better part of the 40 triremes this *polis* mobilised in 480. That is to say that 200 odd triremes would be available in the Saronic gulf when all the ships had been built, and would be available against Persia, provided the naval powers in question could decide to make common cause. Even in that case their aggregate strength of 200 does not seem a very dangerous total when compared with the 353 triremes the Ionians brought into the field at Lade. Of course someone could have foreseen the potential for Persian alarm in the light of the 5 Eretrian triremes and 20 Athenian pentekontors and *ploia makra* that came to help the Ionian insurgents in 499 (Hdt.V 99), and have argued that 200 triremes now would be considered an acute danger by the Persians. However, in view of the recent repeated Persian levies of 600 triremes, the force of such an argument might well appear dubious, since a repetition of the Ionian coup of 499—the seizure of the Aegean fleet of the Persian navy and the reinforcement of this fleet by Greek forces from Europe—must have seemed very improbable indeed. Nevertheless such estimates may have varied with the assessment of the long-term policies of the Persians: but the evident imperturbability of the Athenians should preclude extreme views like that of Hammond who still follows Eduard Meyer and pictures Athenian politics in the decade after the Ionian revolt as entirely dominated by the Persian danger.

Herodotos, of course, does ascribe the plan to conquer Greece to Darius and asserts that its execution started from the moment the outcome of the battle of Marathon became known (VII 1.1-2)[72] and this is

---

[71] That they were able to build 99 may well have surprised Themistokles. However, just as the Athenians adapted their building-programme to the Persian threat, the Peloponnesians will have done the same on a smaller scale, their resources being less abundant. Evidently it came to a sort of arms race when the Persian intentions became clear.

[72] He already attributes more or less the same objective to the expedition under Mardonios in 492 (VI 44.1) and that of subjecting the *poleis* that had not given earth and water in 491 to Datis and Artaphrenes in 490. Modern scholars go much farther, e.g. 'With King Darius' invasion of European Thrace and the northern Scythian regions in 513 B.C. an Achaemenid *imperial policy* <my italics> of expan-

almost universally accepted as the truth by modern historians[73]. If it were, and here we must remember that Herodotos asserts that Darius' preparations caused great commotion in Asia for three years (ἡ 'Ασίη ἐδονέετο ἐπὶ τρία ἔτεα: VII 1.2), the Athenians' total disregard of the Persian danger in 483 would be unbelievable. But of course there is every reason to doubt Herodotos' (or better: Herodotos' informants') assertions on this subject. Reliable information about Darius' plans cannot have been available to any Greek, nor indeed to any but the most elevated Persian functionary. That alone makes such assertions extremely doubtful. If, moreover, the Persian defeat in 490, and especially Miltiades' move against Paros, had led to Persian apprehensions concerning their Asiatic subjects and the safety of their naval base(s), the king may well have moved more troops and ships into the area as a precaution. Such movements (and any routine troop and ship movements), of however circumscribed a scope they may have been at the time, were almost inevitably destined to be misjudged, hence exaggerated, in the perspective of the events of 480-79. And the duration of Darius' supposed preparation is an added reason for suspicion: Xerxes also took three years to take to arms (Hdt.VII 22.1), and his colossal preparations will undoubtedly have caused a stir in Asia. These three years, therefore, are the crucial datum, and only in Xerxes' case is there a solid basis for the tradition: the digging of the Athos canal cannot be attributed to a more innocent policy.

These three years have a relatively precise terminus. Macan, it is true, suggests three possibilities (at Hdt.VII 22.1): 'is it the king's departure from Susa, or from Sardes, or is it the actual use of the canal by the fleet on its arrival?'. Of the three, however, the first two have no relation whatever with the canal, so that only the third can be taken seriously. This is to say that the digging was begun roughly three years before July 480[74], i.e. early in the Athenian year 483/2, the year when Themistokles submitted his navy bill. Herodotos' inexactness (ἐκ

---

sion toward Greece had begun' (Balcer 1989: 128 referring to Olmstead 1939: 305-22) and this extreme view pervades the recent edition of *CAH* IV, to begin with the editorial Preface (p. XVIII, cf. pp.68, 234: 'the real aim of conquering all Europe').

[73] Cf.e.g. Weiler 1988: 232 ('Mit dem Ende des ionischen Intermezzos verlagerte sich der Schwerpunkt der Auseinandersetzung aufs griechische Festland. 493 <*sic*> sicherte Mardonios den persischen Einflußbereich in Thrakien und Makedonien und lud Athen ... und Sparta zur freiwilligen Unterwerfung ein, ein Begehren, das freilich abgewiesen wurde. Als Persiens Antwort darauf erfolgte der Feldzug unter Datis und Artaphernes...'); Murray 1980: 260 ('The battle <of Marathon> was an episode in the continuing advance that had been decided on by Darius after the Ionian revolt was effectively ended in 494'), cf. 1988: 490.

[74] For this date see Hignett 1963: 453, where the evidence is carefully mustered.

τριῶν ἐτέων κου μάλιστα) suggests a date later rather than earlier in the beginning of the year (otherwise his informants would not have qualified the 'three years'). As the navy bill was passed early in the year 483/2 (see p.152 n.62), it is a real possibility that it preceded the beginning of the Persian preparations. This possibility has as far as I know never been seriously considered, but implies a train of events far more probable than that commonly assumed (especially in view of the discussion of Themistokles' navy bill). I would indeed suggest that the latter not only preceded the Persian decision, but that this decision was taken as a reaction against it. For such a reaction would entirely be in line with the naval policy I have ascribed to the Persian authorities (see p.144f.), a policy moreover that evidently lay at the basis of the Persian strategy in 480 (see Wallinga 1990: 147) and aimed at eliminating any naval power that could be considered a threat to the Persian navy and the Persian position in the coastal possessions. The Peisistratidai and their friends no doubt saw to it that the satrap in Sardis was informed in record time.

The Athenians must have been very surprised when the Persians reacted so promptly and so excessively, as must have become clear relatively early[75]. The mobilization of some 1200 triremes, by far the largest battle-fleet ever assembled in antiquity, must in any case have been considered disproportionate, certainly in combination with that of the land forces, which was also huge, however much Greek tradition may have exaggerated its magnitude[76]. But though I would not deny the immensity of the Persian naval effort, I do not consider it out of all proportion. After all, operating so far from its main base in the Levant Xerxes' fleet had to include ample reserves and the king had to reckon with the whole of the Greek potential at sea including the Sicilian and Korkyraian navies, the latter numbering at least 260 triremes according to Herodotos[77]. I would, moreover, not exclude that the king expected to

---

[75] Though the Greeks will not have become acquainted with the full extent of the Persian preparations before, say, their march to Tempe (Tempe may indeed have been given up because enormous figures became known that the Greeks thought were reliable), the unprecedented size of the operation will have manifested itself much earlier in the digging of the canal, the construction of the Hellespont bridges, orders for the building of ships and the preparation of dumps of supplies, none of which could be kept secret (or was intended to be kept secret).

[76] I consider the estimates of Maurice (150,000 combatants, 60,000 non-combatants, 75,000 animals: 1929: 225-228) acceptable approximations (cf.Burn 1962: 328 n.41).

[77] VII 158.4 (Syracuse: 200); 168.2 (Korkyra: 60). More Sicilian *poleis* must have possessed ships (Thukydides specifies 'tyrants' as the possessors: I 14.2), but Hero-

top success in Greece with an attack farther west[78]. If he had such hopes, we should be wary of ascribing them to *hybris*. The fact is that such colossal naval operations could not be repeated at short notice and that, once one was organized, commanders would want to exploit its potential to the utmost, especially when the first success came early. That the plan for an attack on the West was ascribed to Kambyses (Hdt.III 19.2[79]: see p.130f.) demonstrates that such pushing on was considered natural in Herodotos' time, and this, combined with the necessity to keep the potential of such a naval operation at a high level, made ample material reserves indispensable. The two requirements fully explain the very high figures for Xerxes' fleet.

As the threat of this immense undertaking began to materialize, the Athenians—perhaps recognizing that they were in a very real sense the originators of this calamity—must immediately have started discussions on how to react[80]. These discussions —whether public or private— certainly led to one important step in the naval sphere: the reserve of one hundred talents, deposited with the 100 richest Athenians, was now used (in part) for the building of another 100 triremes. According to 'Aristotle' it was Themistokles himself who took this important decision (ἐναυπηγήσατο τριήρεις ἑκατόν: XXII 7), and although this will not be literally true, it implies that his influence here was crucial. In Polyainos' version (I 30. 6) the rich men lay down the ships without Themistokles' intervention. This may be a simple omission. The two versions together (and the absence of any trace of public discussion) suggest, no doubt rightly, that this decision did not involve the Athenian assembly. For Themistokles' law left the spending of the moneys entrusted to the 100 to their discretion. Still, the decision cannot have been easy: building ships meant that funds for manning them had to be raised in another way. With the certainty (at best!) of a long hot summer of fighting, that must have been a disturbing prospect. So

---

dotos' figures (at any rate for Gelo's ships) are suspiciously round and invite doubt: no one had seen these navies in action. Still, whatever the real value of these figures the Persians no doubt had to reckon with them, and probably with even larger ones.

78 Not necessarily aiming at conquest but, like Darius with the Skythian expedition, at the deterrence of potential attackers of Persian subjects (cf. Wallinga 1984: 417ff.).

79 Not necessarily on Carthage: the opposition of the Phoenicians may well have been caused by other objections.

80 It seems more than probable to me that Themistokles played a dominant part in these discussions, although the tradition does not preserve detailed information, except for his activity concerning the ending of the Greek wars (Plu. *Them.*VI 5). I see no reason for Frost's scepticism on this score (1980: 98-99).

discussion there no doubt was and, if there was, Themistokles (surely one of the 100) must have been in the thick of it[81]. If the shipbuilding programme was now extended, the reason is rather obvious. The availability of many ships (i.e. more than could be readily manned) would give the Athenians, and the Greeks in general, tactical elbow room, and that was desirable especially in view of the enormity of the Persian preparations. For if one thing must have seemed certain to the Greeks, it was that such a colossal campaign could not last more than one season in its full extent. That made it imperative to aim at delaying tactics and in particular at denying the Persians if possible the chance to force the issue in a decisive battle. This strategic aim is clearly visible in the well-known sequence of defensive lines—Tempe/Artemision[82], Thermopylai/Artemision, Isthmos/Salamis and Isthmos/Isthmos—that sums up the Greek strategy. The very notion of successive 'last trenches' presupposes the need (and the will) to maintain as far as possible a material reserve. This need must have decided the Athenian choice.

It is impossible on the evidence at our disposal to establish the moment of this decision. One thing seems certain however: that it was not taken in the spring of 480, as is suggested by Herodotos and Nepos (VII 144.2 and *Them.*II 8 respectively). At that moment, when the Greeks began to mobilize, it was far too late to build a hundred more ships. The Troizen inscription does indeed confirm that the second hundred triremes were available in spring 480. But the two equal fleets of that text may well owe their separate assignments to the fact that the 'second hundred' then still needed the finishing touch, and for that reason were kept at their base for the moment, which also was prudent in view of possible Persian raids.

The decision to build the second hundred triremes is taken in most current interpretations as the measure of the capabilities of the *polis* Athens, and in a sense that is true enough. But this judgment has to be put into perspective: without the ascertained fact of Xerxes' mobilization and the realization of its enormity this second effort would not have

---

[81] I am inclined to think that this discussion took place in the Areopagos, to which most of the 100 will have belonged. The tradition that in 480 this Council was involved in the financing of the actual warfare (Arist.*Ath.*XXIII 1) suggests as much (though it is not proof). The tradition that the Areopagos was responsible for the battle of Salamis may well imply far more decisions than the single one mentioned by 'Aristotle' (see p.156 n.68).

[82] Tempe/Artemision is not generally seen as such a defensive line, but it surely must have been. If Artemision is not associated with Tempe in the tradition, the reason is that Tempe was so soon given up and that Artemision as a result became exclusively associated with Thermopylai.

come about, because it devoured such a large part of the financial means to man the ships. The second building effort must indeed be considered the counterpart of the πανδημεί mobilization of 480, that is to say as an emergency measure and on no account meant as a structural policy for the duration, and this in my opinion is just as true of the building programmes launched in the other *poleis* willing to resist the barbarian. The financial difficulties this decision entailed were no doubt great, but the recollection of any distress must have been suppressed by the intoxication of victory. We do not in any case hear about straits in 480 except for the few signs in Athens. The fact that after the battle of Salamis the Athenian ships *were* used 'for the duration' was of course the consequence of the victory and of the Athenian measures taken to organize it: in the short term Themistokles' exactions during the last months of 480 and then the foundation of the Delian alliance. That fact by itself must not therefore beguile us into thinking that Athens could otherwise have afforded that mammoth armament.

CHAPTER SEVEN

EPILOGUE

We have seen that Thukydides' analysis of the development of the Greek *nautika* led him to distinguish three stages, which are separated by bursts of change, one dated to the last quarter of the eighth century (721-704 B.C.), the other to the five or six years before Xerxes' expedition. The first of these bursts resulted in the genesis of the *polis* navies and through that innovation to the first modest specialization in the fitting out, and perhaps also in the design, of the naval galleys. Corinth here led the way and also progressed further than other *poleis*: the organization of its naval arm almost in one leap reached the level of sophistication of Thukydides' own times in that naukraric ships did not play more than a very minor part in it. The only sea-powers that could bear comparison with Corinth were Polykrates' Samos and also Phokaia, though Thukydides significantly does not extend the qualification 'nearly modern' to these navies: that will mean that he was aware that the status of the ships in them was not comparable to that of their state-owned Corinthian counterparts.

But in spite of their pre-eminence, the technical level of these three leading navies remained rather primitive in comparison with the navies of the later fifth century. The bulk of the ships were still of the types already encountered in the Homeric poems: general-purpose galleys (πλοῖα μακρά) and pentekontors. Triremes were rare, even more so than Thukydides' Corinthian informants seem to have suggested. On the other hand the successes of Polykrates against the Persian empire, of Phokaia against Carthage and of Corinth in making war on far-away Korkyra and in suppressing piracy were proof that these *nautika* had to be regarded as real powers within their own orbits.

The era of Darius' death and Xerxes' first years then brought the second burst of change, the reorganization of the naval arms of the more important *poleis*, which consisted in the final abolition of the naukraric galleys and the wholesale adoption of state-owned triremes, first by the Sicilian tyrants and Korkyra, then by Aigina and Athens (and, though Thukydides does not say so, most other free *poleis* in the Aegean area). In Aigina and Athens insignificant navies were now replaced by the fleets of triremes that triumphed over Persia.

My argument goes to show that Thukydides' analysis and the account of the naval developments he based on it are entirely convincing in so far as the Aegean world and the Greek West are concerned. What is not convincing, what is indeed more than disconcerting, is his total disregard of the eastern, including even the Phoenician, contribution to the evolution he tried to characterize. Given the evident importance the matter had for him (and the great importance of the navies of the East in Herodotos' history) this cannot be a question of his 'giving no systematic account' that is said to explain other apparent omissions; nor of his 'limiting his statement to Greece', as might be inferred from his remark on the Corinthians as the first trireme-builders; nor even of the inadequacy of the information preserved by Herodotos. For Thukydides' account here *is* systematic; it touches on eastern matters in the references to the Ionian war with Cyrus and to Polykrates, and indeed to the Persian wars; and it is largely based on Herodotean material, which is rich precisely in eastern data. If a really important step was taken in the East in the process that Thukydides wanted to describe—and on Herodotos' and his own evidence there is reason indeed to come to that conclusion—his silence is very strange. I suggest that it was caused by his inability to apply his analysis of the Greek developments to those of the East. He must have been uncertain as to how the several elements of that analysis—old-style versus new-style naval organization, small-scale *polis* navies versus the adoption of triremes en masse and the abolition of the naukraric galleys—had functioned there; and how this had influenced the genesis of the all-trireme sea-powers of the East, and in particular the creation of the Persian navy.

Herodotos' evidence made clear that in Greece substantial sea-powers were rare. Corinth and Athens were the only presentable ones, but as far as Corinth was concerned this evidence seemed insufficient to Thukydides who successfully tried to supplement it, and Athens' navy only became presentable at a very late date. Of the two Ionian *poleis* with a naval history, Phokaia functioned in the West and its navy—consisting of merchant ('naukraric') galleys in the main—was not comparable with Corinth's or Athens' 'Themistoklean' one. Polykrates with his 40 triremes was more like these, but the function of his navy in the Greek context was not very clear. 'Ionian' navies of course appeared at Lade, but Thukydides did not count them in. This suggests that he knew or suspected that the fleets at Lade were essentially different from his (continental) Greek navies.

In his writing days, moreover, the situation in the Aegean and in Greece in general again was such that there were very few sea-powers

of note: in the League only Athens and Chios. At the same time his informants suggested that this had been different in earlier times, and that in particular there had been many ship-contributors in the Delian league. Herodotos' terminology for the subjects' contribution to the Persian naval arm also suggested that ship-contributors had been an important element in the military organization of the Persian empire. For Thukydides there thus was a contrast between his immediate experience on the one hand and on the other his information concerning the Delian league and these other data. This contrast was further accentuated because in Herodotos the Phoenician cities—the most important of the supposed ship-contributors of the Persian empire—were without any naval history of their own in spite of their essential role in the Persian system.

All this is confusing even now, and must have been so to Thukydides. The most bewildering factor in this confusion is the tradition, unspecified but evidently respectable in Thukydides' eyes, that there had been many ship-contributors in the Delian league. For Herodotos' terminology has turned out to be misleading in suggesting that Persian subjects were allowed their own navies, and already was suspect to Thukydides, ship-contributors (peace-time patrols) playing only a very minor part in the Persian naval organization. Therefore this Delian tradition becomes an isolated datum and not very worthy of credence, especially to someone who had already banned the ship-contributors of Lade from his tableau. It seems clear that there was some special reason why Thukydides still accepted this 'tradition'.

Here we must remember that when the Peloponnesian war began only two remained of the five undoubted non-tributary members[1] and that very soon afterwards only one of them was left. Materially this numerical decline may not have made any difference for the remain-

[1] I take as the five original ship-contributing members: Samos, Chios, Lesbos, Naxos and Thasos (West 1929-30: 272; *HCT* I 284). In 413 two Rhodian pentekontors went to Sicily with the great expedition (Th.VI 43), but it is hardly believable that this means that 'Rhodes', i.e. the three Rhodian cities, had become ship-contributors. It is more plausible that allies were allowed some ships of their own if they were tributary, even in the case of major allies such as Samos after they had been deprived by Athens of their trireme fleets. See the cases of 'Rhodes' just mentioned, Miletos (Th.VIII 61.2) and Samos (*ib.*16.1) and cf. Andrewes in *HCT* V.38. I am tempted to say that this was accepted by Athens as long as the navies in question remained of the 'old-fashioned' type of Thukydides' *nautika* chapters, as were the Rhodian pentekontors. It may well be that the ordinary members of the Delian league had such 'navies' as a rule, just as Mytilene had had a 'navy' under Persian rule (Hdt.III 39.4). On the other hand there is no reason to exclude that the ships of Samos and Miletos just mentioned (and others) had been built in connection with the revolts of 412.

ing ship-contributor(s) as regards either the frequency of their mobilization or the extent of their contribution, because the Athenian navy took over the tasks. But even if these burdens did not change in pure quantity, the psychological effect of the ship-contributor(s) being the only one(s) left could easily lead to complaints of the 'oppressed', perhaps the louder for not being officially lodged and therefore not officially denied. These complaints would have made much of the 'old situation'. The Chians could indeed argue with a semblance of truth that formerly there had been 'many more' ship-contributors and may even have meant no more than the four of the original list. But if they did, the suggestion implied in their argument nevertheless pointed in the other direction—of numerous ship contributors—and wrongly so. For just as there is no real trace of the navies of the 'ship-contributors' at Salamis after the battle except for Corinth, Aigina and Athens, so there is no reason to think that the situation was different in the sphere of the former subjects of Persia. If there ever had been many more ship-contributors than Athens itself and the five just mentioned, these cannot have been other than the islands contributing to the fleet at Salamis and their contributing cannot have lasted more than very few years[2]. Only rich *poleis* could afford triremes under their own power. But together these elements in the past of the Delian league were just enough to clinch Thukydides' uncertainty and confusion. As Snodgrass has suggested to me, a major source of Thukydides' confusion may have been the very narrow margin of Eastern priority in the development of the trireme. This, and the circumstance that the central part in it was played by powers not considered maritime in his time, could indeed have had the result that his informants, just as Herodotos, never mentioned these powers in this connection, so as to make him refrain from deeper probing. This may well be the explanation of 'his most specific and important omission'. It is no excuse for the all too many modern historians who have followed his example.

---

[2] The suggestion that these islands were among Thukydides' ship-contributors was first made by West (1929-30: 272ff.). From the fact that they do not figure in the first assessment documents he inferred that they still contributed ships at the time. But even if they had started out to do that, I consider it most probable that very soon after 479 they had had to lay up their proud triremes (if any!) for lack of money *and* for lack of rowers (which they lost to the no doubt better-paying Athenian fleet).

APPENDIX

THE CREWS OF GREEK AND PERSIAN TRIREMES[1]

The trireme was the line-of-battle ship in well-nigh all the navies taking part on either side in the Graeco-Persian hostilities of 480 and 479. It held its position during the fifth and the better part of the fourth century and, even after it had lost pride of place to the hellenistic *polyêreis,* it remained in use as for instance in the Rhodian navy. In the Roman imperial navy the trireme again was the standard unit for the major Italian fleets (see *SSAW* ch.5 and p.141).

In view of the starring role of the type we know singularly little of the details of its use. This lack of information is especially annoying in the case of the crews. In the Athenian navy—to which our information is almost wholly restricted—the full crew of a trireme included all of 200 men, 170 rowers and 30 others (see *GOS* 254f.; *SSAW* 84 and 300ff.). With the exception of the commander and the 14 marines all these men had to be 'able seamen' in the literal sense, the rowers in particular. Since each of them pulled his own oar (*SSAW* 82), they all had to be trained men. For that reason the commission of a minor fleet of sixty fully manned triremes would have been a major operation, entailing the mobilization of some 12,000 trained men, a larger number than that of the Athenian army at Marathon (see Busolt 1895: 584 n.1) and of the armies facing each other at Mantineia in 418 (Id., 1897-1904: 1248), and involving huge costs in pay. Naval operations involving hundreds of triremes—such as those of the year 480—should surely be rated colossal, at least for *poleis,* if it were certain that the crews were always at establishment.

In modern studies this is almost always taken for granted, even to the extent that population estimates are based on the number of triremes in naval mobilizations deemed total (πανδημεί). Thus Roebuck has made such estimates for the Ionian cities on the basis of the numbers of triremes in Herodotos' account of the battle of Lade (cf. Roebuck 1959: 21-23, 1979: 24), and Labarbe has used the tradition concerning the new Athenian navy of 483 to verify his count of the Athenian population of that moment (1957: 139ff.). However, as I shall demonstrate, this procedure is inadmissible.

---

[1] This appendix is the revised version of a paper published in 1982 in J.den Boeft, A.H.M.Kessels (eds.), *ACTUS. Studies in honour of H.L.W.Nelson* (pp.463-482).

The notion that triremes always had a crew of *c.*200 men has never to my knowledge been seriously examined. Herodotos' figures for the Persian mobilization of 480—1200 ships and 241,400 men (VII 184.1)—have it is true provoked much disbelief, but mostly to the effect that the number of ships is repudiated, as for instance by Eduard Meyer (1939: 354) and recently by C.Hignett (1963: 345-350); and even *if* doubts are raised concerning the number of the oarsmen, these doubts are no more than guesswork (E.Meyer 1939: 354 and 338n.1). Nevertheless there is reason enough to doubt Herodotos' figures, those for the crews in particular: 204,000 (1200x170) trained oarsmen may have been available in the entire Persian empire, but to mobilize them all would have paralysed whole sections of the economy, especially the trade of the Phoenicians and other seaboard peoples.

Very little is known of the population of the Phoenician cities, in particular for the fifth century, but it seems reasonable to assume that it was comparable to that of the fourth century, when Sidon and Tyre according to Beloch had a population of not more than 40,000 each (1886: 244 quoting Arr. *Anab.* II 24; D.S. XVII 46 and XVI 45). The Phoenician contribution to Xerxes' fleet was 300 triremes, or on Herodotos' reckoning 60,000 men, including 51,000 rowers. Even if we put the population of the Phoenician cities at a total of 300,000, this would imply the mobilization of about all the able-bodied men. There can be no doubt that this is impossible and that Herodotos' calculation is fundamentally wrong. That surely is reason enough to inspect closely the evidence that leads to equating the oar crew of every trireme with 170 men[2].

The Accounts of the Athenian Naval Board show 'that a *trieres* in the fourth century normally carried 200 oars' (*GOS* 289), 170 in three classes: *thranite* (62), *zygian* (54) and *thalamian* (54); and 30 in a fourth, *perineoi,* which are plausibly considered to be spares (see Morrison 1947: 131f.). That is to say that the rowing complement of a trireme numbered 170 *at most,* not that in practice the crews of all triremes invariably included that number.

Again, sometimes the pay of a trireme's crew is computed for a certain period *in the future,* as in the negotiations between Athens and

---

[2] There is no respectable evidence for Hammond's assertion that 'The Phoenicians had built somewhat larger triremes than the Chians ...; for they had a crew of 200 and 40 marines, whereas Chian triremes had a crew of 150 and 40 marines' for the battle of Lade (1988: 504). Here Herodotos' assumption for 480: crews of 200 and 30 Iranian marines in addition to 10 native ones (VII 184.1) is combined with Eduard Meyer's arbitrary assumption of 150 crew members; Meyer perversely thought that at Lade the ships were pentekontors (1939: 338 n.1 and 288 n.1; see p.183).

Segesta in 415 (Th.VI 8.1) and between Sparta and Persia in 412 (Th.VIII 29.2) and 407 (Xen.*HG* I 1.5). In these cases it is assumed that the crews will number 200. The same is done by Demosthenes and Aischines when assessing the cost of proposed mobilizations (Dem. IV 28; Aeschin. III 97). In these cases the figure at best testifies to the intention of negotiating parties and politicians to make crews as full as possible.

As far as actual crews are concerned, however, these are paper figures: there is no guarantee that such intentions were realized to the full. When Herodotos puts the crews of Xerxes' 1207 triremes at 241,000 men, this grand total is based on just such a paper figure, as he makes absolutely clear (ὡς ἀνὰ διηκοσίους ἄνδρας λογιζομένοισι ἐν ἑκάστῃ νηί: VII 184.1)[3]. Herodotos does not pretend that he is reporting tradition: he calculates.

On the other hand he tells us that one particular Athenian commander, Kleinias, who fought with marked distinction in the last engagement off Artemision, had furnished his own ship with a crew of 200 at his own cost (VIII 17). This ship probably had such a crew, but it would be rash to consider Kleinias' crew as typical. Herodotos' informant may well have emphasized the strength of that crew because it was altogether exceptional. This case therefore does no more than corroborate that the maximum crew of a trireme numbered 200 men.

Concerning the oarsmen of the Athenian fleet in 480 the 'Decree of Themistokles' is now read as follows (*ML* no.23):

27 ἀναγράψα-
28 ι δὲ κα[ὶ τοὺς ἄλλους κατὰ] ναῦν τοὺς στρατηγοὺς κτλ.
31 νέμοντας κατὰ τάξ-
32 εις [ε]ὶς διακοσίας ἀ[ν]ὰ ἑκατὸν ἀριθμὸν κτλ.[4]

It has been doubted 'that a trireme could move with a hundred men' (Jameson 1963: 394 n.19), not to speak of fighting effectively. Are such doubts reasonable? It seems to me that they are not. Triremes were used as troop transports (Th.VI 43; see p.175) and were converted into horse transports. From the Naval Accounts it appears that horse transports carried 60 oars (e.g. *IG* II² 1628.154f.) and so were rowed by sixty men at most[5] and it may be presumed that troop transports were rowed by a

---

[3] For the crew of a Mytilenaian trireme in Kambyses' fleet (Hdt. III 14.4) see p.130 n.1)

[4] For our appreciation of this aspect of the provisions of the decree it makes no difference whether we believe in Themistokles' authorship (as I do myself) or assume it to be the work of a fourth-century forger: especially a forger had to keep within the limits of plausibility.

[5] The 60 oarsmen no doubt were the *thranitai* of the original triremes, which carried 62 oars for them: the other banks had room for 54 oars only; see *GOS* 270

comparable crew, although in this case the number may have been more variable[6]. Both types of transport took part in the Sicilian and other naval expeditions (Th.II 56.2; VI 43): their oarage must therefore have been adequate for moving.

As to fighting, our evidence is less unambiguous. Everything here depends on what is considered fighting. If fighting always involved *diekplous* tactics, i.e. prolonged manoeuvring at high speeds, a crew of sixty oarsmen would be out of the question. But this premiss is open to grave doubt. Like modern scholars Thukydides seems to have accepted it for a time, but he learned otherwise.

His account of the battle of Sybota between Korkyra and Corinth and its allies begins as follows: 'It was a fight with ships (ἐναυμάχουν), but on both sides many hoplites were on the decks, as well as archers and javelin throwers. They followed the ancient fashion, for they still lacked experience. It was indeed a hard fight, but their skill fell short: an infantry battle was what one would compare. For once they had come to blows it was not easy for them to disengage because of the entangled multitude of ships, and because they relied mostly on the hoplites on the decks for victory. These men fought a pitched battle while the ships remained motionless. The tactics of *diekplous* were not applied: courage and brute force were important in the fighting, not tactical know-how' (I 49.1-3).

Here Thukydides implicitly contrasts the expectations of the discriminating Athenian eye-witnesses of the battle (and of any knowledgeable Athenian as he was himself) and the actual progress of the battle, which disappointed them by its tactical backwardness. His description definitely proves that not all fighting at sea was done according to *diekplous* tactics[7], and that triremes for that reason were not invariably required to be fully manned. As long as there was no question of protracted manoeuvring and certainly if ships remained motionless as at Sybota, speed and staying power were not essential: in such situations the marines were the dominant factor and for them immobility was an advantage. Between the extremes of immobility and the practice of *diekplous* there must have been a scale of tactical possibilities and commanders accordingly must have had freedom to

---

and Morrison, Coates 1986: 137).

[6] Depending in theory on the number of troops to be transported. In practice the oarsmen will have been restricted to one bank to give the troops as much living space as possible.

[7] For these tactics see Wallinga 1956: 32ff.; *GOS* 135ff.; Morrison-Coates 1986: 43 al. (perverse! corrected by Lazenby 1987 and Whitehead 1987); cf. Holladay 1988 and Wallinga 1990: 141ff.).

fix the degree of manning of their ships according to their (or their opponents' expected) choice of tactics. Conversely, the available manpower will have determined whether they had any scope at all.

In the battle of Sybota both fleets appear to have been undermanned; if Thukydides' immobility is taken to the letter, even far undermanned. This is hardly surprising: both fleets, in particular that of Corinth and its allies, were very large. Altogether some 260 ships took part, 270 if the ten of the first Athenian squadron are included (Th.I 45.1, 46.1, 47.1). This is as many as in the battle of the Arginusai (Xen.*HG* I 6.24-26; D.S. XIII 97-99), but how different were the contestants! At the Arginusai the Athenian empire versus the Peloponnesian league backed by Persia, at Sybota two ordinary *poleis*, one in league with five smaller, in part much smaller, ones. Corinth itself is said to have mustered all of ninety triremes, full crews for which would have totalled 18,000 men. This seems an impossibly large number for a *polis* of only some 40,000 inhabitants (see Beloch 1886: 119ff.). It is true that rowers were recruited elsewhere (in the rest of the Peloponnese and Greece in general, even in the Athenian sphere of influence: Th.I 31.1, 35.3), but this clearly was insufficient witness the immobility of the ships during the battle.

In this case the size of the *poleis* involved could be the reason why the crews were defective. Still there are cases where the context is different. According to the 'Decree of Themistokles', already quoted, 100 oarsmen were all the Athenians could muster in 480: Ἀθηναίου[ς δ' ἅπ]α[ντας καὶ τοὺς ξένο]υς τοὺς οἰκοῦντας Ἀθήνησι (ll.6-7)[8]. Again, one could argue that that was a most exceptional mobilization, the first of its kind in Athens, at a moment, moreover, when the population had not yet been fully geared to naval service. However, even the Athenian navy in its prime furnishes some examples.

A clear case of a large Athenian fleet of triremes which were not fully manned is Konon's in 407. Konon took over 100 ships with demoralized and apparently depleted crews and concentrated the men on, i.e. (more) fully manned, seventy (Xen.*HG* I 5.20: συμπληρώσας τριήρεις ἑβδομήκοντα ἀντὶ τῶν προτέρων). The term συμπληροῦν is also

---

[8] The reading δ' ἅπ]α[ντας (Habicht's) 'seems to fit the traces better than Jameson's [ς δὲ α]ὐτ[οὺς' (ML p.49; cf.Habicht 1961: 1 n.3). It is ironical that this reading should have been proposed by someone absolutely rejecting the decree as genuine, for it ought to be taken as important evidence for its genuineness, and at least for the genuineness of this tradition. What forger would have fabricated such a detail? Certainly not the man who—anachronistically according to Habicht—ascribed 10 marines and 4 archers, i.e. the standard fighting crew of the crack triremes of the later fifth and fourth centuries, to each trireme. The 100 oarsmen are inexplicable as the fantasy of such a forger.

used by Thukydides in describing the first operations of the allied fleet in the Sicilian waters in 415. When the commanders had agreed to Alkibiades' plan for a diplomatic approach of the Sikels and the Sikeliots, they fully manned sixty ships out of the whole force (εὐθὺς ξυμπληρώσαντες ἑξήκοντα ναῦς ἐκ πασῶν: Th.VI 50.2) and sailed along the coast to Naxos and other cities, evidently a demonstration in force[9]. The whole fleet counted 134 triremes, 100 of the Athenians (60 fast ones and 40 transports) and 34 of the allies, not specified but presumably some 20 fast ones and 14 transports[10]. The 80 fast ships of this fleet appear not to have been fully manned: we must assume that the crews were concentrated as in Konon's fleet just mentioned, or that oarsmen were taken from the transports, to bring the crews of the 60 flag-showing units up to establishment. And here there can be no question of circumstances limiting the availability of oarsmen, for Thukydides characterizes this expedition as 'the most expensive and splendid ever' (πολυτελεστάτη δὴ καὶ εὐπρεπεστάτη τῶν ἐς ἐκεῖνον χρόνον: VI 31.1). I conclude that even in the Athenian navy undermanning was habitual[11].

Undermanning must in part have been the consequence of the scarcity of trained oarsmen, but there was another, most important, cause. The Greek trireme has been compared by Tarn (1933: 59) to a 'glorified racing eight' and, although this certainly is an exaggeration (as Tarn concedes), the type must have been vulnerable. As a consequence, the problem of the replacement of damaged ships during operations, especially operations at great distance from the home waters, must at all times have been foremost in the minds of naval authorities. Once expensive personnel was hired it became imperative to ensure that the men should not be idle. For this reason we must assume that, unless ships were to operate in home waters, reserves were always included in the force mobilized. This is what we see in the case of the Sicilian expedition; the same clearly applies to the fleet Corinth (and its allies) sent to Korkyra in 433.

These cases demonstrate what I suggest is true for other fleets operating far from home waters, among them the navies of the Persian kings (see p.184): that reserves were included or, to put it in another way, that not all the ships were fully manned. The decision whether to use all, or only part of, the available ships in the actual hostilities would depend on

---

9 For the 'majesty and terror' of a fully manned trireme see Xen. *Oec.*VIII 8.

10 I assume that the two categories of allied ships were in the same proportion as in the Athenian squadron: there is no reason to think that all the allied ships were transports (cf. *HCT* IV 308-9).

11 This wording is Casson's (cf. Jameson 1963: 394 n.19).

the strength of the opponent and on the nature of the operations. Reserves could of course be used as troop transports; conversely, transports, like those included in the expedition for Sicily, may be counted as reserves and could be turned into fighting ships by augmenting the crews. That is why Thukydides, in summing up the mobilization of 415, can split up the total of 100 Athenian triremes in sixty ταχεῖαι and 40 στρατιώτιδες (VI 43): both categories were triremes. The only difference between them was the size of their (oar) crews.

The same difference appears to be implied in Thukydides' account of what happened to the crew of the Paralos, one of the Athenian state triremes, in 411 (Th. VIII 73.2). This crew was transferred to a *stratiotis*, which was then sent to Euboia on guard duty, work for a fast trireme. Morrison has inferred from this passage that '*stratiotis* was a category of ship rather than one actually carrying troops, since it is unlikely that troops would be carried on a guard ship' (*GOS* 247), and—provided that it is understood that it is as unlikely that a *stratiotis* would be used on guard duty—this inference is valid indeed. The *stratiotis* in other words became a ναῦς ταχεῖα when its small crew (if any) was reinforced by the addition of the *Paraloi*. This episode in other words suggests that *stratiotis* had as much the meaning 'trireme with minimal crew (or: with one bank of oars manned)', as that of 'transport'. The same is implied by Xenophon (*HG* I 1.36), when he relates that Klearchos went from Megara to Byzantion with 15 ships which were στρατιωτίδων μᾶλλον ἢ ταχείων ('more transports than fast' i.e. 'rather undermanned'). Xenophon's wording is expressive of something lacking rather than of the positive quality of being a transport. This is born out by the following words: καὶ αὐτοῦ τῶν νεῶν τρεῖς ἀπόλλυνται ('consequently his flotilla lost three ships', viz. when it was attacked by only nine Athenian ships). Thukydides again uses *stratiotis* more in the sense of 'reserve' than of 'transport' at VIII 62.2 (25 ships among which were reserves with hoplites on board 'ὧν καὶ στρατιωτίδες ἦσαν ὁπλίτας ἄγουσαι'): here Morrison rightly remarks that 'The words suggest that some of the ships might have been *stratiotides* without actually carrying troops' (*GOS* 247).

In his discussion of the term *stratiotis* (*HCT* IV 308f.) Dover has strongly doubted that the *stratiotis* was 'a normal trireme with a skeleton crew of sailors and a full complement of soldiers' (whom he makes man the oars![12]) on the ground that this hypothesis 'does not account for

[12] Dover, in other words, makes the soldiers αὐτερέται. This hypothesis seems untenable to me. It would imply that Athenian hoplites were able to row as a rule: for this there is no evidence. The converse on the other hand, that rowers—pre-

the term στρατιῶτις. According to Dover one would expect that "the troops themselves rowed 40 of the ships" rather than "40 of the ships were στρατιωτίδες"). Moreover he holds that it does not explain the transfer of the entire crew of the *Paralos* to a στρατιῶτις in 411 (VIII 74.2, cf. 86.9)', although he recognizes that it would account for other cases and would mean 'that once they had landed their troops the troop carriers constituted a reserve of fighting ships', as I maintained above. As his remark on the crew of the Paralos shows[13], Dover's interpretation starts from the dogma that a real trireme was always fully manned. But once this dogma is rejected, as it must be, his objections to the interpretation of *stratiotis* as 'a normal trireme with a skeleton crew' lose point[14].

Dover's disinclination to accept the *stratiotis* as a normal trireme with skeleton crew is also caused by another dogma concerning the trireme, namely that in its genesis and later use only its speed, i.e. ramming capacity, was of importance. But as I have argued above (p.108), transport capacity from the beginning was just as essential an attribute as speed. This is fully borne out by the Greek tradition: from the very first, troop transport was a vital task of the triremes described. This applies to the Naxian expedition (Hdt.V 32-33.1), the expedition of Datis and Artaphrenes (Id. VI 95.2), Kimon's fleets at Eurymedon and in the Cyprian

---

eminently fit men—could be and were used as soldiers, is undeniable. Philoktetes' rowers were archers too (*Il.*II 719-20, cf.Th.I 10.4); rowers of Peloponnesian ships under Gylippos were armed by the Himeraians (Th.VII 1.3): this was the result of Alkibiades' advice (Th.VI 91.4: αὐτερέται κομισθέντες καὶ ὁπλιτεύσουσιν εὐθύς); in 409 Thrasyllos equipped 5000 rowers as peltasts (Xen.*HG* I 2.1, cf. Best 1969: 37 and n.11). Alkibiades' use of the verb ὁπλιτεύειν for his αὐτερέται does not of course make the men hoplites in the strict sense of 'citizens able to equip themselves with full personal armour' (Parke, *OCD*[2], s.v.hoplites). In Nikias' eyes the Peloponnesian αὐτερέται were little better than pirates (λῃστικώτερον παρεσκευασμένους! Th.VI 104.3). On the other hand there is evidence that some hoplites could row: a force of 1000 hoplites was sent to Mytilene under Paches in 428 (αὐτερέται: Th.III 16.1). But observe that Paches' soldiers were not ἐκ καταλόγου and may have been picked men or volunteers, if they were not thetes serving as 'hoplites', as thetes were when employed as *epibatai* (cf. Th.VI 43).

13 There is no reason to assume that the crew of the Paralos was complete under all circumstances (cf.Dem.XXI 174), although it no doubt will have been more full than the average. On the other hand the *stratiotis* to which the *Paraloi* were transferred, may well have been 'empty' or practically so.

14 It is of course possible, as Dover also suggests, that there was structural difference between the *stratiotis* and the 'normal' trireme, but that the former was 'reconvertible into a fighting ship' (quotations from Dover's note). It certainly is very well conceivable that rowing benches were taken out of ships actually transporting troops to give the men more room. If so, this structural difference would seem to have been slight and the rowing benches easily reinstalled; nor would the difference be much greater, if flooring had been put in place of the benches. There is no evidence for either possibility and it is pointless to speculate.

expedition (Th.I 100.1; Plu.*Cim*.XII 2[15]; Th.I 112.1-4), as well as the Sicilian expeditions (Th.VI 43 and VII 42.1).

The equal importance of both functions of the trireme accounts for the double nomenclature of στρατιῶτις and ναῦς ταχεῖα/ταχυναυτοῦσα, but from the existence of both terms it must not be inferred that these categories were uniform. As I said (p.172) the number of oarsmen in transports may have been variable, more variable at any rate than in horse transports. It is equally possible that in 'fast' ships the degree of manning was variable too. For it must never be forgotten that the ship propelled by *trikrotos* oarage was not fundamentally different in displacement from its *monokrotos* predecessor (of which the horse transport and the *stratiotis*-with-skeleton-crew are variants).

There is some evidence that this hypothesis, which is plausible a priori, covers the facts. Thukydides describes a Peloponnesian fleet under Knemos in 429—47 ships, five of which were ἄριστα πλέουσαι—as στρατιωτικώτερον παρεσκευασμένοι (II 83.5) and when Xenophon calls Klearchos' ships, already mentioned, '*stratiotides* rather than fast ones', this choice of words in particular suggests that the categories were conterminous and that *naus tacheia/tachynautousa* simply stands for 'ship of the line' and *stratiotis/hoplitagogos* for 'trireme not of the line' without regard to the exact degree of manning.

There can be little doubt, in short, that the manning of ships in fifth and fourth century fleets was not uniform. In practice the degree of manning will have depended on a number of factors: the availability of oarsmen in the first place; financial means; the intended or expected character of the operations; and perhaps others. Actions against pirates, for instance, will have required fast ships, that is to say large crews: hence the unique occurrence in the Athenian Naval Accounts of the term ταχυναυτοῦσαι, applied to two new triremes that were detailed ἐπὶ τὴν φυλακὴν τῶν λειστῶν (*IG* II^2 1623.276ff.[16]). Here the number of ships is very small indeed. Larger fleets will have resembled the Athenian fleet in the Sicilian expedition, although the degree of manning will as

---

15 Plutarch states here that Kimon introduced alterations in the construction of (existing!) Athenian triremes: he made them flatter (πλατυτέρας) and built a crossing (διάβασιν) between their decks (καταστρώματα) so that they had more room for hoplites and consequently had more fighting-power in the attack against the enemy (ὡς ἂν ὑπο πολλῶν ὁπλιτῶν μαχιμώτεραι προσφέροιντο τοῖς πολεμίοις). Morrison (*GOS* 162-3; M., Coates 1986: 154-55) takes these alterations to be the return to an old-fashioned mode of sea-fighting. I have insurmountable doubts: that Plutarch speaks of *hoplites*, not *epibatai* (an important difference overlooked by Morrison) must signify that Kimon's alterations had to do with transport of troops.

16 This entry is disastrously misread by Morrison (1986: 154 n.25: 'four hulls are specified as "fast" and of these three are in fact said to be new'!).

a rule have been below the standard set by that magnificent armada. All larger fleets, therefore, will have been undermanned at the moment of mobilization. The question is what consequences this had in practice.

Thukydides' description of the battle of Sybota gives us some clues to determine the considerations which led the Corinthian commanders to use their forces in the way they eventually did. The fundamental datum was the number of Korkyraian ships (120: Th.I 25.4; 29.4). The strength of this armament and the fact that it would be deployed in home waters made it necessary for the Corinthians to have at least as many units. The great distance from Corinth at which they would have to operate obliged them to bring reserves. Their total strength of 150 ships took account of these fundamental aspects of the situation. Also they spared no pains to find crews for those ships they could not man themselves (*ib.*31.1, 35.3). Presumably they were able to guess in how far the Korkyraians would be able to man theirs. In the event the Korkyraians, though they even mobilized slaves (*ib.*55.1[17]), were not able to man 10 of their triremes (*ib.*47.1 compared with 25.2 and 29.4) so that the Corinthians—on the arbitrary assumption that, when the battle began, they had manned all their ships[18] —had a majority of 40 ships. This majority was counterbalanced up to a point by the presence of an Athenian squadron of 10 triremes, which—as Thukydides remarks (*ib.* 49.4)—struck terror into the Corinthian side[19], even before it actually participated in the fighting: it only became involved in the battle when the Corinthian left wing threatened to overwhelm the Korkyraian right (*ib.* 49.7).

This left wing of the Corinthians is particularly interesting. According to Thukydides it was composed (though only partly! see p.24 n.29) of ταῖς ἄριστα τῶν νεῶν πλεούσαις and was very successful: πολὺ

---

17 For the slaves in the crews of the Korkyraian triremes see Welwei (1977: 113-117). I agree with Welwei against Casson (*SSAW* 323 n.4) that these slaves must have served as oarsmen in a πανδημεί mobilization. Welwei's treatment of the difficulties in this situation is vitiated by his belief in the dogma that a trireme always had 170 rowers. The chief difficulty—that 800 out of 1050 prisoners taken were slaves—can be explained by assuming that the slaves had remained on board of the ships that were taken by the enemy, while most free members of the crews had jumped ship and swum ashore. Perhaps the slaves could not swim, or had hoped to gain their freedom, or a more bearable lot, in this way.

18 I would suppose that the Corinthians had precise information concerning the strength of the Korkyraian fleet from the moment the Korkyraians had made their camp on one of the Sybota islands (Th.I 47.1), since the continentals of the region were their friends (*ib.*47.3). So the assumption is far from necessary.

19 Surely also because its ships were far more fully manned than those of either of the opponents, not *only* because of their great reputation.

ἐνίκων (Th.I 49.6), notwithstanding the presence of the Athenian squadron. These ships clearly are understood by Thukydides as a kind of striking force, being of better quality than the rest. The problem is in what this better (or best) quality consisted, i.e. what made the ships ἄριστα πλέουσαι.

There can be no doubt in my view that quality here means speed. This is evident from Thukydides' description (VII 23.2) of the flight of a group of Athenian soldiers in merchant galleys and a sailing vessel, chased by one Syracusan trireme which was εὖ πλέουσα. Although Thukydides does not expressly say so, this presumably means that it was detailed (μιᾶς!) for the purpose because it was fast[20]. Likewise Konon escaped Kallikratidas at one moment during the operations of summer 406 thanks to ταῖς ναυσὶν εὖ πλεούσαις. In Apollodoros' litany of Polykles' tergiversations (Dem. L) the theme is the speaker's personal outlay to make his ship the best sailer (12,46,52) by hiring as many oarsmen as possible. And in Demosthenes' own indictment of Meidias one of the latter's misdeeds, in this case as treasurer of the state trireme Paralos, is the insufficient manning of the ship, so that it was outrun by an ordinary trireme (XXI 174: καὶ τόθ' ἡττᾶττο πλέων τῶν ἰδιωτικῶν τριήρων μιᾶς· οὕτως εὖ τὴν ἱερὰν τριήρη παρεσκευάκει): here the terms πλέων and εὖ are separated syntactically, but it is clear that Demosthenes reproaches Meidias for his failure to make the Paralos εὖ πλέουσα, i.e. fast-sailing.

In theory the speed of these ships, and *a fortiori* of those called ἄμεινον or ἄριστα πλέουσαι[21], could be the result of superior build or of a greater number of, or better rowers. But the first factor cannot in my view be the true explanation, because that ought to come out in the Naval Accounts, which it does not: in the Accounts there is no trace whatever of any differentiation according to the speed of the ships *per se* (on the ships called ταχυναυτοῦσαι of *IG* II² 1623.284 see p.177 at n.16). I am certain therefore that more or better rowers must be the explanation. For both these alternatives there is evidence.

Speed is clearly the result of a full complement of rowers: see Xenophon *Oec.*VIII 8. The trireme mentioned there is chockful of people and the resulting speed (ὅτι ταχὺ πλεῖ) makes it 'a terror to foes and to

---

20 For the interpretation of Th.VII 23.2 ὑπὸ τριήρους μιᾶς καὶ εὖ πλεούσης see *HCT* IV 397-8: it will be clear that I prefer a combination of Dover's alternatives I and IV.

21 E.g. ἄμεινον πλ.: Hdt.VIII 10.1; ἄριστα πλ.: Hdt.VII 96.1, 179; VIII 22.1, 42.2, 46.1; Th.I 48.4; II 83.5, 90.2; VII 31.5; VIII 104.3; Lys.XXI 6; *Hell.Oxy.*IV 1 Bartoletti; Dem.L 12, 46, 52.

friends a feast for the eye'. The escape of the Athenian triremes of Xen.*HG* I 6.16 is explained in I 5.20: 70 ships were fully manned by Konon: συμπληρώσας τριήρεις ἑβδομήκοντα ἀντὶ τῶν προτέρων. On the other hand Xenophon tells us (*ib.* 6.19) that the same Konon made ready two ships to break the blockade of Mytilene by Kallikratidas. He manned these ships by taking the best rowers from all the ships. The ships themselves are specified by Xenophon—before they are manned!—as the best sailers (τὰς ἄριστα πλεούσας) in the Athenian fleet and here it is reasonable to understand this as 'the two best ships in the fleet'. And in Herodotos' comment on the Phoenician contribution to the Persian navy—τούτων δὲ ἄριστα πλεούσας παρείχοντο νέας Φοίνικες: VII 96.1—the Phoenician superiority may have to be explained not only by the number and the quality of the rowers (as compared with e.g. the Cilicians), but also by the quality of the ships as ships. Here the contingents contributed by different nations are compared, but when a distinction is made *within one navy*, as Thukydides does concerning the Corinthian navy (I 48.4) and the Peloponnesian fleets confronting Phormio (II 83.5 and 90.2), and Herodotos concerning the Athenian fleet after Artemision (VIII 22.1) and the Aiginetan navy (*ib.*46.1), the assumption that the faster ships had better rowers, rather than that they had more, seems improbable[22].

There is very little positive evidence upon which to base a decisive argument concerning this problem. But the very absence of data in itself is eloquent testimony that the quality of rowers was not a determining factor in the naval organizations discussed so far. It is indeed striking that Perikles ascribes the naval superiority of Athens in his times to the excellence of steersmen and *hyperesiai*: the availability of the rowers is presupposed and a mere question of money (Th.I 143.1), and their quality passed over in silence. In boasting of the success of his trierarchies an anonymous trierarch strongly suggests that it was due to his openhandedness alone: he constantly harps on his outlays, never on his discrimination in choosing the men (Lys.XXI 2ff.). More or less zeal of Athenian trierarchs will thus have led to difference in quality in their ships, and the same may be assumed for other Greek navies. But such cases as that of the second Peloponnesian fleet confronting Phormio and the Corinthian at Sybota, when the difference in 'quality' of a large part of the ships was exploited tactically, hardly can be

[22] Note that in the latter cases all the ships were new (Th.I 14.3). It seems very improbable to me that the Aiginetan triremes that remained at home were inferior in quality *as ships* when compared with the 30 present at Salamis. The reason that they were not used will have been shortage of oarsmen.

explained in this way. No responsible naval command could permit such latitude to private initiative, not even when differentiation between the ships fitted in with the tactical designs of that command. The Corinthian command at Sybota took as the basis of its tactical concept the classification of their ships in two clear-cut categories. This cannot have been the result of the undirected efforts of the trierarchs; here the command itself must have been involved. And the same applies to such a measure as the transfer of the crew of the *Paralos* to another trireme, except that in this instance a whole crew of exceptional status was involved, not smaller numbers of ordinary oarsmen.

It will be objected perhaps that such shifting of oarsmen, even in small numbers, would impair the attunement so necessary for a rowing crew. This would be true especially if oarsmen were transferred individually: every man transferred could then find himself teamed up with unknown companions. There is however reason to doubt that this was the actual practice. When Thukydides tells us that the trierarchs of the Sicilian expedition offered extra pay to the *thranitai*, and when Aristophanes epitomizes the Athenian rowers as the 'People of the Thranite Oar' (ὁ θρανίτης λεώς: *Ach.*162), the distinguished status thus ascribed to the thranites is in my opinion best explained as due not only to their being the best rowers, but in particular to the function (for this reason) of each of them as the leader ('stroke') of the three rowers in each *interscalmium*[23]. Similar foremen are attested in early-modern galleys[24] and will have been necessary in ancient ones. 'Thranite' is the term available for them (there is no other evidence whatever). If it was such teams that were transferred, the damage to the attunement of the oarsmen would be minimal[25].

---

[23] The superior status of the *thranitai* is explained by Dover (*HCT* IV 295) as 'justified by an estimation of their work as harder and more skilled and by their exposure to greater risk of injury from collision and missiles'. This will all be true (though the risk of the thalamians was no less serious, witness App.*BC* V 436), but it misses the essential point that in the very crowded conditions below deck the sternmost oarsmen could not be seen by the majority of those placed more forward and that therefore the time-setting stroke of the former had as it were to be relayed in the direction of the prow. In this relaying the thranites must have been the vital factor.

[24] See La Roërie, Vivielle 1930: 140-141; Anderson 1962: 69; *IHSB* 123-124; *SSAW* 104 n.35.

[25] I assume that primarily whole teams of 'room-mates' were moved from one ship to another—thranites remaining thranites and so on—but that during operations, when there had been casualties (or desertions, cf. Dem. L 7, 11, 14, 16 al.), men were also transferred from one rowing bank to another, zugians being 'promoted' to the thranite bank etc. The latter procedure was possible because the oars in each *interscalmium* were of the same length.

There can be no doubt in my view that tactical requirements regularly led to the shifting of oarsmen during naval operations. This must often have been done to even out initial differences between crews[26]: if these differences were too great they could endanger the coherence in a phalanx-like battle order. On the other hand, if a different tactical concept was followed (as by the Corinthians at Sybota) or if, simply, the plan of campaign required extra fast ships (as for reconnoitring: see Hdt.VII 179), shifting in the opposite sense must have taken place as well. Commanders must have had the power to enforce this and eventually to overrule 'proprietary' claims of trierarchs (such as those in the Sicilian expedition who had succeeded in 'persuading' thranites to work for them). And this procedure was unavoidable in case ships were damaged, if only to prevent expensive oarsmen from being idle[27].

Through failure to recognize this most important aspect of the management of ancient navies modern scholars have come to very unrealistic judgements concerning ancient naval warfare in general and in particular concerning the personnel involved. The use of the number of ships in the fleets of *poleis* as a basis for estimates of their populations is an extreme example of this. Another is the rash rejection of the traditions concerning the number of ships in the fleets of the Persian wars[28].

We must realize that numbers of ships in the traditions of the Aegean world cannot be translated into manpower in any simple way, and can even less be taken as a yardstick for actual naval power. This must have been clear to Thukydides and his contemporaries. It is the reason why he can call the Sicilian expedition 'the greatest ever mounted by one Greek city' (*HCT* IV 292), although he knew that Kimon's expeditions to the Eurymedon and to Cyprus were greater in the number of ships[29]. What Thukydides assumes his readers to under-

---

[26] Such initial differences may well have been the rule, being normally due to the rivalry between the trierarchs, a rivalry going back to the days of the naukraries. The extra pay mentioned by Thukydides (VI 31.3) will have been an extreme instance of this rivalry.

[27] I assume that the shifting was resorted to only in critical situations and that the shifted oarsmen returned to the ships of their original trierarchs as soon as things had returned to normal.

[28] For recent examples see P.L.Tozzi 1978: 203 and n.115; Morrison-Coates 1986: 56 ('It seems likely that ... the correct figure for the Persian fleet at Artemisium is about 600-700 ...'); Murray 1988: 487 ('600 ships ... at least in theory', whatever that is supposed to mean).

[29] See for the numbers Busolt 1895: 143 and n.2; 342 and n.2. Kimon's ships, in any case those at Eurymedon, clearly were hoplite transports for the most part (see p.177 n.15).

stand, what indeed he takes for granted[30], is that in the Sicilian expedition the degree to which the ships were manned was incomparably higher than in the force for Poteidaia, which was its equivalent in pure numbers (Th.VI 31.2), and in the big expeditions to the Levant under Kimon.

For all these reasons I conclude that the shifting of oarsmen, dispersing or concentrating them in accordance with tactical needs, must have been normal procedure in all ancient fleets as long as the oarsmen had all to be trained men and were for that reason hard to come by. It is precisely this possibility of transferring rowers from one bank to another, which made for flexibility in the use of the trireme. This flexibility I consider to be the reason why smaller Greek *poleis* could adopt, and continue to use, the trireme once it had been introduced after the example of the big powers in the East. If truly the trireme could only move with 170 rowers, this would have put the ship out of reach of all but the biggest *poleis*.

If the hypothesis that the manning of triremes was variable is accepted, it becomes possible to have confidence in traditions which hitherto have raised grave doubts. At the beginning of this paper I mentioned Eduard Meyer's rejection of Herodotos' figures for Xerxes' grand armada. I now want to return to the great scholar's criticism of the tradition concerning this and other Persian fleets and to demonstrate that, though strictly wrong, his strictures were very realistic.

Meyer's criticism of Herodotos' figures is most explicit concerning the fleet of 600 triremes under the command of Datis and Artaphrenes in 490 (1939: 288, 306). He rejected the figure of 600, because it repeats those of the fleets in the Skythian expedition and in the battle of Lade: such figures he repeatedly asserted to be 'konventionell' or 'stereotyp' and much too high. He held, moreover, that the fleet of 490 consisted of transports, not of warships, 'wohl offene Pentekonteren die von den Mannschaften selbst gerudert wurden' (*ib.*, 306).

This criticism is a curious mixture of the hard-headed and the fantastic. Fantastic certainly is the suggestion that Persians and Sakai, for such were the troops transported (Hdt.VI 113.1), should have been able to row; and little better is the idea that pentekontors were used. This not only disregards Herodotos' testimony (VI 9.1 and 95.2, the second passage being most explicit), but also the pentekontor's unfitness as a transport and all the evidence concerning the *stratiotis*! But if at the start

[30] See *HCT* I 1ff., esp. 22: 'he assumes ... that he need not explain the organization of Greek navies'.

of the expedition Datis' triremes were all used as transports, their oar crews numbering some 60 each, and so were not much different from pentekontors as far as personnel is concerned, there remains nothing to object to from Meyer's point of view. Such a fleet of 600 *stratiotides* could be converted into a fighting fleet of some 250 to 300 'fast' ships by concentrating the crews. That would have been more than enough to overwhelm all Naxian, Eretrian and Athenian ships (at that time still mostly pentekontors: Th.I 14.2) taken together.

The Persian fleet at Lade must have been similarly constituted. When its 600 ships arrived at their destination, the commanders took alarm because their opponents were much stronger than they had expected: yet the Ionians had no more than 353 triremes (Hdt. VI 8.2, 9.1). This must mean that the line-of-battle potential of the Persian fleet was not much different from the Ionian strength. On this assumption the fears of the commanders are credible enough, the more so because the Ionians were in home waters. Reserve personnel could be expected to be at hand for them, whereas the Persians were far from their home base and would have none available. Still, that is not to say that these Ionian ships were all fully manned. On the contrary: the unwillingness of the crews to continue Dionysios' training programme (see p.73-74) may well have been stiffened, if it had not actually been caused, by his spreading the oarsmen over too many ships, thus making each man's task heavier.

The 1200 or so ships of Xerxes must be explained in the same way. True, modern scepticism concerning this enormous figure is not unreasonable, but chiefly because the Greek traditions about what happened to this fleet, in particular the losses it suffered before the battles of Artemision were fought, are so confusing. The cause must be that the Greek contemporaries were confused themselves. Because they had no experience of such navies, and in particular were not as yet conversant with the distinction between ship of the line and reserve, they reckoned all the ships that had been counted among the former. The fact that in the battles off Artemision only part of the ships counted came into action, had then to be explained as the consequence of previous losses. Hence the inference that the storm off Sepias had been a great disaster (it will have been bad enough) and, when the fleet at Salamis appeared much stronger than at Artemision, the unavoidable conclusion that continental Greeks and islanders had supplied the difference (Hdt.VIII 66)[31].

---

[31] This confusion was aggravated when Herodotos' Athenian informants put the

Grundy (1901: 219) took Herodotos' fleets of 600 triremes as 'the ordinary naval levy' of the Persians and explained the 1200 of 480 as just double this levy. With this judgement I wholeheartedly agree. Grundy also thought that 'there are no solid grounds for doubting' these figures. On Herodotos' assumption of 200 men per trireme we would have grounds enough, as Eduard Meyer clearly felt. On the hypothesis that these fleets were far undermanned, because a large number of the ships came as reserves, there is no need for doubt[32].

---

initial strength of the Persian fleet at 1207 ships (VII 89.1) by misinterpreting Aischylos' description of the Persian attack at Salamis as made by a thousand + 207 ships (*Pers.*341-342: for the correct interpretation, including the 207 in the 1000, see Broadhead's comment on 339-340) and adapted their estimation of the replacement of the Persian losses to make that distortion stand.

[32] Nor is there in the case of Plutarch's assertion that Perikles sent out sixty triremes each year (*Per.*XI 4; cf. Meiggs 1972: Endnote 13 and Stadter's excellent note). Eddy's objections to the reading 'sixty' in Plutarch's text (142ff.) are based on the dogma of the full crews and for that reason untenable. His proposal to read 'sixteen' (*ib.*, esp. 149ff.) is open to another, surely even more compelling, objection, viz. that it totally disregards—as is very often done—the political function of the Delian naval forces. If really the League had not kept at least sixty ships in commission each year, the Persians would no doubt have tried to re-enter the Aegean; and if its yearly effort had been at its maximum with sixteen, they would have succeeded.

BIBLIOGRAPHY [1]

AH, Heleen Sancisi-Weerdenburg and Amélie Kuhrt (eds.), *Achaemenid history* I, II, Leiden 1987; III Leiden 1988; IV, V, Leiden 1990; VI, Leiden 1991.
ANET, *Ancient Near Eastern Texts Relating to the Old Testament*, ed. J. B. Pritchard, Princeton 1969.
APF, J.K. Davies, *Athenian propertied families 600-300 B.C.*, Oxford 1971.
ARAB, D.D. Luckenbill, *Ancient records of Assyria and Babylonia* I, II, Chicago 1926-1927.
CAH, *Cambridge Ancient History*.
Comp.Hom., A.J.B. Wace, F.H.Stubbings (eds.), *A companion to Homer*, London 1962.
DKP, Konrat Ziegler, Walther Sontheimer (Hrsg.), *Der Kleine Pauly. Lexicon der Antike*, München 1975, pb. ed. 1979.
EG, D. L. Page (ed.), *Epigrammata Graeca*, Oxford 1975.
FW, Elena Cassin, Jean Bottero, Jean Vercoutter (Hrsg.), *Fischer Weltgeschichte* Band 4: Die Altorientalischen Reiche, Frankfort am Main 1967.
GGM, *Geographi Graeci Minores*.
GOS, J.S. Morrison, R.T. Williams, *Greek oared ships 900—322 B.C.*, Cambridge 1968.
HCP, F.W. Walbank, *A historical commentary on Polybius* I, Oxford 1957, repr. 1970.
HCT, AW. Gomme, K.J. Dover, A. Andrewes, *A historical commentary on Thucydides* I-V, Oxford 1945-1981.
IHSB, Lionel Casson, *Illustrated history of ships and boats*, Garden City, New York 1964.
LSJ, H.G. Liddell, R. Scott, *Greek-English lexicon*, 9th ed., rev. by H. Stuart Jones and R. Mackenzie, Oxford 1940.
ML, Russell Meiggs and David Lewis (eds.), *A selection of Greek historical inscriptions to the end of the fifth century*, Oxford 1969.
MM, *The Mariner's Mirror*.
Mediterranean, The, Koninklijk Nederlands Meteorologisch Instituut, *Middellandse zee—The M., oceanographic and meteorological Data*, 's-Gravenhage 1957.
Pilot, *The Mediterranean Pilot* IV, London ^{8}1955.
OCD, *Oxford Classical Dictionary*, Oxford ^{2}1971.
PGM, D.L. Page (ed.), *Poetae melici graeci*, Oxford 1962, repr. 1975).
RE, G. Wissowa *et al.*, *Pauly's Real-Encyclopädie der Classischen Altertumswissenschaft*, Stuttgart 1893–1981.
SSAW, Lionel Casson, *Ships and seamanship in the ancient world*, Princeton 1971.

Ackroyd, P.R. (1970), *Israel under Babylon and Persia*, Oxford, repr. 1986.
Anderson, R.C.(1962), *Oared fighting ships*, London.
Assmann, A. (1888), Seewesen, in A.Baumeister (Hrsg.), *Denkmäler des klassischen Altertums* III, München, Leipzig.
Austin, M.M. (1970), *Greece and Egypt in the archaic age* (Proceedings of the Cambr. Philol.Soc., Suppl.No.2).
Austin, M.M.,Vidal-Naquet, P. (1977), *Economic and social history of ancient Greece: An introduction*, London.
Bakhuizen, S.C. (1990), Nautai en aeinautai, *Utrechtse Historische Cahiers*, 11, 13-27.

[1] Titles of journals have been abbreviated as in *L'année philologique*.

Balcer, J.M. (1984), *Sparda by the Bitter Sea: Imperial interaction in western Anatolia* (Brown Judaic Studies 52), Chico, California.
——, (1987), *Herodotus and Bisitun. Problems in ancient Persian historiography* (Historia Einzelschriften Heft 49), Stuttgart.
——, (1989), The Persian wars against Greece, *Historia* XXXVIII, 127–143.
Barnett, R.D. (1969), Ezekiel and Tyre, *Eretz-Israel* IX, 6-13.
Basch, L. (1969), Phoenician oared ships, *MM* 55, 139-162; 227-245.
——, (1977), Trières grecques, phéniciennes et égyptiennes, *JHS* XCVII, 1-10.
——, (1987), *Le musée imaginaire de la marine antique*, Athènes (quoted by page and column: e.g. 316.2).
Baumgart, W. (1986), *Deutschland im Zeitalter des Imperialismus 1890-1914*, Stuttgart Berlin Köln Mainz, 5e Aufl.
Beaumont, R.L.(1936), Greek influence in the Adriatic Sea before the fourth century, *JHS* LVI, 159-204.
——, (1939), The date of the first treaty between Rome and Carthage, *JRS* XXIX, 74-86.
Beloch, K.J. (1886), *Die Bevölkerung der griechisch-römischen Welt*, Leipzig.
——, (1913), *Griechische Geschichte* I^2.2, Straßburg.
Bengtson, H. (1969, 1980), *Griechische Geschichte*, München, 4e, 5e Aufl.
Berve, H. (1967), *Die Tyrannis bei den Griechen* I, II, München.
Best, J.G.P. (1969), *Thracian peltasts and their influence on Greek warfare*, Groningen.
Bickerman, E. (1968), *Chronology of the Ancient World*, London.
Blackman, D. (1969), The Athenian navy and allied naval contributions in the Pentecontaetia, *GRBS* 10, 179-216.
Blazquez, J.M. (1968), *Tartessos y los origenes de la colonizacion fenicia en occidente*, Salamanca.
Boardman, J. (1980), *The Greeks overseas*, London.
Boersma, J.S. (1970), *Athenian building policy from 561/0 to 405/4 B.C.*, Groningen.
Boffo, L. (1979), Il logos di Orete, *RAL* VIII.XXXIV, 85ff.
Bolgar, R.R. (1954), *The classical heritage and its beneficiaries*, Cambridge, repr.1977.
Bondì, S.F. (1990), I Fenici in Erodoto, in *Hérodote et les peuples non grecs* (Entretiens sur l'antiquité classique Tome XXXV), Vandoeuvres-Genève.
Braun, T.F.R.E. (1983), The Greeks in Egypt, *CAH* III^2.3, 32-56.
Bravo, B. (1977), Remarques sur les assizes sociales, les formes d'organisation et la terminologie du commerce maritime grec à l'époque archaïque, *DHA* 3, 1-59.
——, (1980), Sulân. Représailles et justice privée contre des étrangers dans les cités grecques, *ASNP* III.X, 675-987.
——, (1983), La commerce des céréales chez les Grecs de l'époque archaïque, in Peter Garnsey, C.R. Whittaker (eds.), *Trade and famine in classical antiquity* (Cambr.Philol.Soc. Suppl.Vol. no.8), 17-29.
——, (1984), Commerce et noblesse en Grèce archaïque, *DHA* 10, 99-160.
Breusing, A. (1886), *Die Nautik der Alten*, Bremen.
Brøndsted, J. (1965), *The Vikings*, Harmondsworth.
Bruch, R. vom (1980), *Wissenschaft, Politik und öffentliche Meinung* (Historische Studien Heft 453), Husum.
Burn, A.R. (1960), *The lyric age of Greece*, London.
——, (1962), *Persia and the Greeks*, London.
Burnet, J. (1911), *Plato's Phaedo*, Oxford.
Busolt, G. (1893,1895), *Griechische Geschichte* I^2, II^2, Gotha.
Busolt, G. (1920-1926), *Griechische Staatskunde* I, II (Vol.II rev. by H. Swoboda), München.
Carlier, P. (1984), *La royauté en Grèce avant Alexandre*, Strasbourg.
Casson, L. (1950), The Isis and her voyage, *TAPA* 81, 43-56.
——, (1969), Sailing, in Carl Roebuck (ed.), *The muses at work*, Cambridge Mass. and London.
Chantraîne, P., *Dictionnaire étymologique de la langue grecque*, Paris 1968–1980.

Classen, J., Steup, J., *Thukydides* I, Berlin ^{5}1914.
Cook, J.M. (1982), The eastern Greeks, *CAH* III^{2}, 196-221.
Curtius, E. (1878), *Griechische Geschichte* II^{5}, Berlin.
Davies, O. (1936), *Roman mines in Europe*, Oxford.
Davison, J.A. (1947), The first Greek triremes, *CQ* XLI, 18-24.
De Graeve, M.Chr. (1981), *The ships of the Ancient Near East* (Orientalia Lovanensia VII), Leuven.
Develin, R. (1977), Miltiades and the Parian expedition, *AC* 46, 571-577.
Dionisotti, A.C. (1988), Nepos and the generals, *JRS* LXVIII, 35-69.
Drews, R. (1983), *Basileus: the evidence for kingship in geometric Greece* (Yale Classical Monographs 4), New Haven and London.
Drijvers, J.W. (1992), Strabo VIII 2,1 (C335): PORΘMEIA and the *diolkos*, *Mnemosyne* IV.XLV, 75-78.
Drioton, E., Vandier, J. (1984), *L'Égypte. Des origines à la conquête d'Alexandre*, Paris 6e éd.
Drower, M.S. (1973), Syria *c.*1550-1400 B.C., *CAH* II^{3}, 417-525.
Dunbabin, T.J. (1948), *The western Greeks*, Oxford.
Duncan-Jones, R.P. (1977), Giant cargo-ships in antiquity, *CQ* LXXI, 331-332.
Duncker, M. (1882), *Geschichte des Altertums*, Leipzig, Dritte, vierte und fünfte Aufl.
Dunst, G. (1974), 'Archaische Inschriften und Dokumente der Pentekontaetia aus Samos, *AM* 87 (1972, publ. 1974), 2.Excurs: Die Samaina, 159-160.
Eddy, S.K. (1968), Athens' peacetime navy in the age of Pericles, *GRBS* 9, 141-156.
Eph'al, I. (1988), *Syria and Palestine under Achaemenid rule*, *CAH* IV^{2}, 139–164.
Figueira, T.J. (1982), *Aegina. Society and politics*, New York.
Fine, J.V.A. (1983), *The ancient Greeks. A critical history*, Cambridge Mass.
Finley, M.I. (1975), *The use and abuse of history*, London.
——, (1980), *Ancient slavery and modern ideology*, London.
Fol, A., Hammond, N.G.L. (1988), Persia in Europe, apart from Greece, *CAH* IV^{2}, 234-253.
Forbes, R.J. (1964), *Studies in ancient technology* IX, Leiden.
Fränkel, H. (1921), *Die homerischen Gleichnisse*, Gottingen 2.Aufl. 1977.
Frisk, H., *Griechisches etymologisches Wörterbuch*, Heidelberg 1954-1972.
Frost, F.J. (1980), *Plutarch's Themistocles. A historical commentary*, Princeton N.J.
Gardiner, A. (1960), *Egypt of the Pharaohs*, Oxford.
Garelli, P. (1974), P.G., V.Nikiprowetzky, *Le Proche-Orient asiatique: les empires mésopotamiens, Israël* (Nouvelle Clio 2bis), Paris.
Garlan, Y. (1989), *Guerre et économie en Grèce ancienne*, Paris.
Gehrke, H.J. (1986), *Jenseits von Athen und Sparta. Das dritte Griechenland und seine Staatenwelt*, München.
Gisinger, F. (1941), Philostephanos, *RE* XX, Spp.104-118.
Göttlicher, A. (1985), *Die Schiffe der Antike*, Berlin.
Goitein, S.D. (1967), *A Mediterranean Society* I: Economic foundations, Berkeley, Los Angeles, London.
Gomme, A.W. (1937), *Essays in Greek History and Literature*, Oxford.
Graham, A.J. (1982), The colonial expansion of Greece, *CAH* III^{2}.3, 83-162.
Gras, M. (1972), A propos de la "bataille d' Alalia", *Latomus* 31, 698-718.
——, (1987), Marseille, la bataille d'Alalia et Delphes, *DHA* 13, 161-181.
Gray, D. (1974), 'Seewesen', in F.Matz, H.-G.Buchholz (Hrsg.), *Archaeologica Homerica* I Kap.G, Göttingen.
Griffith, A. (1987), Democedes of Croton: A Greek doctor at the court of Darius, *AH* II, 37-51.
Grote, G. (1856), *History of Greece* , New York (repr. from the London edition).
Grundy, G.B. (1901), *The great Persian war and its preliminaries*, London.
Habicht, C. (1961), Falsche Urkunden zur Geschichte Athens im Zeitalter der Perserkriege, *Hermes* 89, 1–35.

Hainsworth, J.B (1988), .Alfred Heubeck, Stephanie West, J.B. Hainsworth, *A commentary on Homer's Odyssey* I: Introduction and books I-VIII, Oxford.

Hammond, N.G.L. (1982), The pursuit of power by the Dorian states, *CAH* III³, 326-341.

——, (1982), Herodotus VII and the decree of Themistocles at Troezen. *JHS* CII, 75–93.

——, (1988), The expedition of Datis and Artaphernes; The expedition of Xerxes, *CAH* IV², 491-591.

Harden, D. (1962), *The Phoenicians*, London.

Hayes, W.C. (1973), Egypt: Internal affairs from Tuthmosis I to the death of Amenophis III, *CAH* II³.1, 313-416.

Healy, J.F. (1978), *Mining and metallurgy in the Greek and Roman world*, London.

Hignett, C. (1952), *A history of the Athenian constitution*, Oxford, repr.1958.

——, (1963), *Xerxes' invasion of Greece*, Oxford.

Höckmann, O. (1985), *Antike Seefahrt*, München.

Hoekstra, A. (1989), Alfred Heubeck, Arie Hoekstra, *A commentary on Homer's Odyssey* II: Books IX-XVI, Oxford.

Holladay, A.J. (1988), Further thoughts on trireme tactics, *G&R* XXXV, 149-151.

Hopkins, K. (1983), Introduction, in Peter Garnsey, Keith Hopkins and C.R. Whittaker (eds.), *Trade in the ancient economy*, IX-XXV.

Hornell, J. (1946), *Water transport. Origins and early evolution*, Cambridge.

How, W.W., Wells, J. (1912), *A commentary on Herodotus*, Oxford, repr. 1936.

Hude, C., *Herodoti historiae*, Oxford ³1927, repr.1940.

Humphreys, S.C. (1977), Review of Gray 1974, *CPh* LXXII, 347-355.

——, (1978), *Anthropology and the Greeks*, London, Henley and Boston.

Huss, W. (1992), *Karthago*, Hrsg. von W. Huss (Wege der Forschung Bd.654), Darmstadt.

James, T.G.H. (1991), Egypt: the twenty-fifth and twenty-sixth dynasties, *CAH* III².2, 677-747.

Jameson, M.H. (1963), The provisions for mobilization in the decree of Themistokles, *Historia* XII, 385-404.

——, (1983), Famine in the Greek world, (see Bravo 1983), 6–16.

Jeffery, L.H. (1976), *Archaic Greece. The city-states c.700-500 B.C.*, London.

——, (1988), Greece before the Persian invasion, *CAH* IV², 347-367.

Jehasse, J.& L. (1982), Alalia/Aleria après la 'victoire à la cadmeénne, *PP* fasc.204-207, 247-255.

Johnston, A.W. (1972), The 'rehabilitation of Sostratos', *PP* 27, 416-423.

Jordan, B. (1975), *The Athenian navy in the classical period*, Berkeley and Los Angeles.

Kahrstedt, U. (1934, 1936), *Studien zum öffentlichen Recht Athens* I, II, Stuttgart, Berlin.

Kienitz, F.K. (1967), Die Saitische Renaissance, in *FW* 4, 256-282.

Köster, A. (1923), *Das antike Seewesen*, Berlin.

Krüger, K.W., Θουκυδίδου ξυγγραφή I.1 (Berlin, ³1860), I.2 (Leipzig, ³1858, bes. von W.Pökel), II.1 (Berlin, ²1858), II.2 (Berlin, ²1861).

Kurt, Chr. (1979), Seemännische Fachausdrücke bei Homer, *ZVS* Erg.-H. Nr.28.

Labarbe, J. (1957), *La loi navale de Thémistocle*, Paris.

Lane, F.C. (1973), *Venice. A maritime republic*, Baltimore and London.

Lazenby, J.F. (1987), The diekplous, *G&R* XXXIV, 169-177.

Lewis, D.M. (1977), *Sparta and Persia* (Cincinnati Studies N.S.I), Leiden.

——, (1988), The tyranny of the Pisistratidae, *CAH* IV², 287-302.

——, (1957), *The history of the British navy*, Harmonsworth, repr.1962.

Lloyd, A.B. (1972), Triremes and the Saïte navy, *JEA* 58, 268-79.

——, (1975), Were Necho's triremes Phoenician?, *JHS* LXXXXV, 45-61.

——, (1980), M. Basch on triremes: some observations, *JHS* C, 195-198.

Macan, R.W., *Herodotus Books IV-VI* I, II, London 1895; *Books VII-IX* I.1,2; II, London 1908.

MacMullen, R. (1983), *Soldier and civilian in the later Roman empire*, Cambridge Mass.

Mallett, M. (1974), *Mercenaries and their masters*, London.
Marienfeld, W. (1957), Wissenschaft und Schlachtflottenbau, *Marine Rundschau*, Beiheft 2.
Mann, G. (1992), *Deutsche Geschichte des 19. und 20. Jahrhunderts*, Frankfurt am Main.
Masson, E. (1967), *Recherches sur les plus anciens emprunts sémitiques en grec* (Etudes et commentaires LXVII), Paris.
Maurice, F. (1930), The size of the army of Xerxes in the invasion of Greece 480 B.C., *JHS* L, 210-235.
Meiggs, R. (1972), *The Athenian empire*, Oxford.
Mele, A. (1979), *Il commercio greco arcaico. Prexis ed emporie* (Cahiers du Centre Jean Bérard, IV), Naples.
Meyer, E. (1892), *Forschungen zur Alten Geschichte* I, Halle a.S.
——, (1924), *Kleine Schriften II*, Halle (Saale).
——, (1936,1939), *Geschichte des Altertums* III^3, Stuttgart, repr. Darmstadt; IV^3.1, Stuttgart.
Meijer, F. (1986), *A history of seafaring in the classical world*, London & Sydney.
Mitchell, T.C. (1991), The Babylonian exile and the restorarion of the Jews in Palestine (586-c.500 B.C., *CAH* III^2.2, 410-460.
Momigliano, A. (1966), *Studies in historiography*, New York and Evanston.
Morel, J.P. (1975), L'expansion phocéenne en occident: dix années de recherches (1966-1975), *BCH* 99, 853-896.
Morrison, J.S. (1941), The Greek trireme, *MM* 27, 14-44.
——, (1947), Notes on certain Greek nautical terms and on three passages in IG II^2 1632, *CQ* XLI, 122-135.
——, (1974), Greek naval tactics in the fifth century BC, *IJNA* 3, 21-26.
——, (1979), The first triremes, *MM* 65, 53-63.
Morrison, J.S., Coates, J.F. (1986), *The Athenian trireme*, Cambridge.
Murray, O. (1980), *Early Greece*, London.
——, (1988), The Ionian revolt, *CAH* IV^2, 461-490.
Murray, W.M. (1987), Do modern winds equal ancient winds?, *MHR* 2, 139–167.
Musti, D. (1989), *Storia greca*, Roma-Bari.
Nenci, G. (1958), *Introduzione alle guerre persiane e altri saggi di storia antica*, Pisa.
Olmstead, A.T. (1948), *History of the Persian empire*, Chicago repr. 1960.
Ormerod, H.A. (1924), *Piracy in the ancient world*, Liverpool repr. 1978.
Ostwald, M. (1988), The reform of the Athenian state by Cleisthenes, *CAH* IV^2, 303-346.
Paret, P. (ed.) (1986), *Makers of modern strategy from Macciavelli to the nuclear age*, Princeton N.J.
Parker, G. (1988), *The military revolution. Military innovation and the rise of the West, 1500-1800*, Cambridge, New York, New Rochelle, Melbourne, Sydney.
Philippson, A., Kirsten E. (1959), *Die griechischen Landschaften* IV, Frankfurt am Main.
Piccirilli, L. (1973), Temistocle εὐεργέτης dei Corciresi, *ASNP* III.III, 317-355.
——, (1983), *Plutarco, Le vite di Temistocle e di Camillo* a cura di Carlo Carena, Mario Manfredini e Luigi Piccirilli (Fondazione Lorenzo Valla).
Podlecki, A. (1975), *The life of Themistocles*, Montreal and London.
Préaux, C. (1978), *Le monde hellénistique*, Paris.
Quinn, T.J. (1981), *Athens and Samos, Lesbos and Chios: 478-404 B.C.*, Manchester.
Ray, J.D. (1987), Egypt: dependence and independence (425-343 B.C.), *AH* I, 79-95.
Reed, C.M. (1984), Maritime traders in the archaic Greek world: a typology of those engaged in the long-distance transfer of goods by sea, *AW* X, 31-44.
Rhodes, P.J. (1981), *A commentary on the Aristotelian Athenian constitution*, Oxford.
——, (1984), *Aristotle, The Athenian constitution*, Harmondsworth.
Robinson, E.S.G. (1946), Rhegion, Zankle-Messana and the Samians, *JHS* LXVI, 13-20.

Roebuck, C. (1959), *Ionian trade and civilization*, New York repr. 1983.
——, (1979), *Economy and society in the early Greek world*, Chicago repr. 1984.
Roërie, G. la, Vivielle, J. (1930), *Navires et marins de la rame à l'hélice*, Paris.
Romilly, J.de (1963), *Thucydides and Athenian imperialism*, Oxford repr. New York 1979.
——, *Thucydide, La guerre du Peloponnèse* I^2, II-V, Paris 1958-1972.
Salmon, J.B. (1984), *Wealthy Corinth. A history of the city*, Oxford repr. 1986.
Salonen, A. (1939), *Die Wasserfahrzeuge in Babylonien* (Studia Orientalia VIII.4), Helsinki.
Sanctis, G. de (1961), *Storia dei Greci*, Firenze 6a ed.
Schmid, W., Stählin, O. (1929), *Geschichte der griechischen Literatur* I.1, München repr.1959.
Schneider, C. (1974), *Information und Absicht bei Thukydides* (Hypomnemata Heft 41), Göttingen.
Schneider, H. (1986), *Das griechische Technikverständnis* (Impulse der Forschung Bd. 54), Darmstadt.
Schuller, W. (1982), *Griechische Geschichte*, München, Wien 2. Aufl.
Schulten, A. (1950), *Tartessos. Ein Beitrag zur ältesten Geschichte des Westens* (Univ. Hamburg, Abhandl. Auslandskunde Bd.54), 2. Aufl.
Schwartz, E. (1957), *Griechische Gechichtsschreiber*, Leipzig.
Sealey, R. (1976), *A history of the Greek city states ca.700-338 B.C.*, Berkeley, Los Angeles, London.
Sekunda, N.V. (1985), Achaemenid colonization in Lydia, *REA* 87, 7-29.
Shefton, B.B. (1982), Greeks and Greek imports in the South of the Iberian peninsula. The archaeological evidence, in H.G. Niemeyer (Hrsg.), *Phönizier im Westen* (Madrider Beiträge Bd.8), Mainz.
Shipley, G. (1987), *A history of Samos 800-188 BC*, Oxford.
Singor, H.W. (1988), *Oorsprong en betekenis van de hoplietenphalanx in het archaïsche Griekenland*, Leiden.
Snodgrass, A.M. (1967), *Arms and armour of the Greeks*, London.
——, (1980), *Archaic Greece*, London, Melbourne, Toronto.
——, (1983), Heavy freight in archaic Greece, (see K.Hopkins 1983), 16-27.
Soden, W. von (1959), Die Eremboi der Odyssee und die Irrfahrt des Menelaos, *WS* LXVII, 26-29.
Stadter, P.A. (1989), *A commentary on Plutarch's Pericles*, Chapel Hill and London.
Starr, Ch.G. (1982), Economic and social conditions in the Greek world, *CAH* III^2.3, 417-441.
Starr, Ch.G. (1989), *The influence of sea power on ancient history*, New York and Oxford.
Stein, H., *Herodotos*, Berlin 1893-1908, 4.-6. verb. Aufl.
Strasburger, H. (1939), Trierarchie, *RE* VII A 1 pp. 106ff. = Studien zur Altern Geschichte I, Hildesheim, New York 1982, 171–176.
Szemerényi, O.J.L. (1986), Etyma Graeca V (30-32): Vocabula Maritima Tria, in A. Etter (Hrsg.), *o-o-pe-ro-s-i. Festschrift für Ernst Risch*, Berlin, New York.
Tarn, W.W. (1933), The oarage of Greek warships, *MM* 19, 52-74.
Thiel, J.H. (1954), *History of Roman sea-power before the second Punic war*, Amsterdam.
Torr, C. (1895), *Ancient Ships*, Cambridge, repr. Chicago 1964.
Tozzi, P. (1978), *La rivolta ionica*, Pisa.
Trenkner, S. (1960), *Le style* καί *dans le récit attique oral* (Bibl. Class. Vangorcumiana IX), Assen.
Ure, P.N. (1926), The outer world in the sixth century, *CAH* IV^1, 83-123.
Vallet, G., Villard, F., (1966), Les Phocéens en Méditerranée occidentale à l'époque archaïque et la fondation de Hyele, *PP* 107, 166-190.
Van Groningen, B.A., *Herodotus' Historiën* III-V, Leiden 1946-1955.
Vélissaropoulos J. (1980), *Les nauclères grecs*, Genève, Paris.
Vidal-Naquet, P. (1983), *Le chasseur noir. Formes de pensée et formes de société dans le monde grec*, Paris 2e éd.

Villard, F. (1960), *La céramique grecque de Marseille*, Paris.
Vlek, R. (1987), *The medieval Utrecht boat* (Nat.Marit.Museum, Greenwich Archaeol. Ser.No.11, BAR Intern.Ser. 382), Oxford.
Von Fritz, K., Kapp, E. (1961), *Aristotle's Constitution of Athens and related texts*, New York.
Wade-Gery, H.T. (1958), *Essays in Greek history*, Oxford.
Wallinga, H.T. (1956), *The boarding-bridge of the Romans*, Groningen, Djakarta.
——, (1964), The unit of capacity for ancient ships, *Mnemosyne* IV.XVII, 1-40.
——, (1965), *De Griekse kolonisatie in Zuid-Italië en Sicilië* (Inaug. lect.), Groningen.
——, (1982), The trireme and its crew, in A.H.M.Kessels, J.den Boeft (eds.), *Actus. Studies in honour of H.L.W.Nelson*, Utrecht, 463-482.
——, (1984), The Ionian revolt, *Mnemosyne*, IV.XXXVII, 401-437.
——, (1987), The Persian navy and its predecessors, *AH* I, 47-77.
——, (1989), Persian tribute, Delian tribute, in Pierre Briant et Clarisse Herrenschmidt (ed.), *Le tribut dans l'empire perse*, Paris, 173–181.
——, (1990), The trireme and history, *Mnemosyne* IV. XLIII, 132-149.
——, (1991), Naval installations in Cilicia Pedias: the defence of the *parathalassia* in Achaimenid times and after, in *De Anatolia antiqua I* (Bibl. Inst. Franç. Etud.Anatol.Istanbul XXXII), 276-281.
Walter, H. (1976), *Das Heraion in Samos*, München, Zürich.
——, (1990), *Das griechische Heiligtum*, Stuttgart.
Walter, H., Vierneisel, K. (1959), Die Funde der Kampagne 1958/59 im Heraion von Samos, *AM* 74, 10-34.
Warmington, B.H. (1964), *Carthage*, Harmondsworth.
Weiler, I. (1988), *Griechische Geschichte*, Darmstadt, 2. Aufl.
Welwei, K.W., (1977), *Unfreie im antiken Kriegsdienst II* (Forschungen zur antiken Sklarerei Band VIII), Wiesbaden.
West, A.B. (1929-30), The tribute lists and the non-tributary members of the Delian league, *AHR* XXXV, 267-275.
West, M.L., *Hesiod, Works and Days*, Oxford 1978
West, S., see Hainsworth.
Westerberg, K. (1983), *Cypriote ships from the bronze age to c.500*, Gothenburg.
Westlake, H.D. (1981), Decline and fall of Tissaphernes, *Historia* 30, 257-279.
Whitehead, I. (1987), The periplous, *G&R* XXXIV, 178-185.
Wiesehöfer, J. (1990), Zypern unter persischer Herrschaft, *AH* IV, 239-252.
Wilamowitz, (1893), *Aristoteles und Athen*, Berlin.
Wilcken, U. (1962), *Griechische Geschichte*, München 9. Aufl.
Will, E. (1955), *Korinthiaka: Recherches sur l'histoire et la civilisation de Corinthe des origines aux guerres médiques*, Paris.
——, (1964), Deux livres sur les guerres médiques et leur temps, *RPh* XXXVIII, 70-88.
——, (1972), *Le monde grec et l'Orient*, Paris.
——, (1979), *Histoire politique du monde hellénistique (323-30 av. J.-C.)* I (Annales de l'Est, Mémoire N° 30), Nancy, 2e éd..
Willcock, M.M. (1978), *The Iliad of Homer Books I-XII*, Basingstoke, London.
Wiseman, D.J. (1991), Babylonia 605-539 B.C., *CAH* III^2.2, 229-251.
Wolski, J. (1985), Hérodote et la construction de la flotte athénienne par Thémistocle, *Storia della storiografia* 7, 113-122.
Young, T.C. (1988), The consolidation of the empire and the limits of its growth under Darius and Xerxes, *CAH* IV^2, 53-111.
Yoyotte, J. (1958), 'Néchao II', *Dictionnaire de la Bible*, Suppl. Tome VI.

INDEX OF ANCIENT SOURCES CITED

Achilleus Tatios
V 16.4: 55n.75
Ailianos (Ael.)
Sch.*Tact.*p.234K.-R.: 46n.44
Aischines (Aeschin.)
III 97: 171
Aischylos (Aesch.)
*Pers.*341-342: 184n.31
Anakreon (Anacr.)
PMG 361: 70n.14
Anecdota Bekker
I 283.20: 17
Anthologia Palatina (*AP*)
V 203.10: 42n.32
VI 222: 42n.32
VII 640.4: 52n.62
Appianos (App.)
BC V 436: 181n.23
*Ill.*I 3: 52n.62
Archilochos (Archil.)
192W: 45n.43,57n.81
Aristeides (Aristid.)
*Or.*II 511: 138n.26
XXV (XLIII) 4: 113n.23
XLVI 187: 148n.50
Aristophanes (Ar.)
*Ach.*162: 181
553: 111
Aristoteles (Arist.)
*Ath.*VII 4: 25n.33
VIII 3: 17n.14
XXII 7: 148,149&n.50, 150,153n.65,162
XXIII 1: 30n.43,156 n.68,163n.81
Arrianos (Arr.)
*Anab.*II 24: 170
III 2.4: 52n.62
Bacchylides (Bacch.)
XVI 87: 46n.44
Charon
FGH 262F7: 71
Choirilos
F6: 94n.73
Cicero (Cic.)
*Att.*V 11.4: 53n.63
XVI 4.4: 53n.63
XVI 8.6: 47n.46
Clemens Alexandrinus
*Strom.*I 16.75,76: 112
Demeas
FGH 502F1: 45n.43,57 n.81
Demosthenes (Dem.)
IV 28: 171
XXI 174: 176n.13,179
XXXV 18: 42n.32
L 7: 181n.25
11: 181n.25
12: 179n.21
14: 181n.25
16: 181n.25
46: 179n.21
52: 179n.21
Dio
XI fr.43.23: 113
L 23.2: 113
Diodoros of Sicily (D.S.)
I 68: 114
XI 2.3: 118n.34
3.7: 118
19.4: 116n.28
27.1: 118n.34
60.6: 123n.49
75.2: 124
77.1: 124
XII 3.2: 123n.49
XIII 97-99: 173
97.3ff.: 74n.31
XIV 80.6-7: 88n.58
XVI 45: 170
XVII 46: 170
Dionysios Periegetes
332: 70n.14
Ephippos
F5.17 K/A: 47n.46
Ephoros (Ephor.)
FGH 70F63: 146
F192: 119n.36,123n.49
Euripides (Eur.)
*Hec.*111: 36
IT 1124: 47n.45

Hanno
*Peripl.*I: 80
Harpokration
s.v. ἀδηφάγους τριήρεις:
26n.35
Hekataios (Hecat.)
FGH 1F93: 67n.4
F101: 67n.4
F102b: 67n.4
Hellenica Oxyrhynchia
IV 1 Bart.: 179n.21
Herodotos (Hdt.)
I 17.3: 66n.2, 78
27: 78
27.1ff.: 66n.2
64.2: 108n.15
77: 86n.54
77.2-3: 86
102.2: 120n.41
141ff.: 22,78
143.1: 121
152: 45
152.1: 69
152.2: 47n.45
153.3-4: 75n.33
163-167: 67
163.1-2: 34
163.2: 35n.10,47n.45,64,69
163.3: 69,75
164.3: 47n.45
165.1: 77
165.2-3: 68n.5
165.3: 78,82n.45
166: 15
166.1: 8,82,83,141n.32
166.2-3: 6
166.2: 21,38
167.3: 83
170.2: 83
II 113.2: 26n.36
152: 91
152.3: 90
152.4: 71,90
154: 71,89
154.5: 90
158: 108
159.1: 103,109n.16
159.3: 86
161.2: 114
163.1: 91n.65
178: 71
178.1: 89
178.2: 77,86
178.3: 77,86
180.2: 40n.29,115
182: 40n.29
182.2: 108-109
III 1.1: 130
4: 86,125n.52
4ff.: 130
4.2: 111,117
11: 86&n.56
13.1: 104n.3
14.4: 171n.3
14.4-5: 104n.3,130n.1
19.2: 83,162
19.2-3: 130
19.3: 118,131
31.4: 26n.36
34.4: 118
39: 115
39.2: 87
39.2-3: 87
39.3: 22,84,103,123
39.4: 8,84,98,99,147,167n.1
41.2: 47n.45
43.2: 99
44: 99&n.81
44.2: 84,104,123
45ff.: 96n.77
59: 98
59.2-3: 8,141n.32
59.3: 96n.77
89.3: 126n.60
122.2: 78,100
123.1: 100
124.2: 47n.45
125.2: 100
126.2: 88
127-128: 88n.58
127.1ff.: 85
136.1ff.: 131
141: 124n.51,131n.3
150.1: 131
IV 33.1: 67n.4
45ff.: 96n.77
87.1: 123n.49,132
89.2: 132
152: 70
152.2-4: 72
152.3: 3
153: 47n.45

156.2: 47n.45
V 9.2: 67n.4
11.2: 143n.40
23.1-2: 143n.40
24.1: 143n.40
30.4: 106,108n.15,139n.28,142
30.4-5: 108
30.5: 133&n.10
31.2: 144
31.4: 133
32: 120n.41,133
32-33.1: 176
47.1: 20n.23
71: 17n.14
75.2: 26n.36
85.1: 142n.36
97.2: 153n.63
99: 98,159
99.1: 106,133
106.6: 83
108.2: 134&n.12
109: 121
112.1: 134
116: 134
124.2: 83,143n.40
126.1: 143n.40
VI 2.1: 83
5.2-3: 142
6: 122
8: 133
8.2: 78,184
9.1: 119n.37,123n.49,132n.7,136,
183, 184
9.2: 136n.17
11-12: 73
11.1ff.: 136n.17
11.2-12.4: 6
12.3: 73
23: 136
25: 136
34: 136
39.1: 142n.36
41: 136
41.2: 143
43.1-2,4: 136
44.1: 137,159n.72
44.3: 137n.19
45.2: 137n.20
46.2: 142,144
48.1: 142
49: 19n.21
87: 18
89: 18,21,21n.27,23,26,67,80n.42,
106,139n.28,141n.35,155
92: 21,155n.66
92.1: 8n.6,23n.27,155n.67
94ff.: 137
95.1: 124
95.2: 123n.49,132n.7,137n.22,176,
183
96: 138n.23
113.1: 183
118.1: 119n.37
119: 138n.23
132: 19n.21,23n.27,145,153n.65
VII 1.1-2: 159
1.2: 160
22.1: 160
25.2: 12n.14
36.1: 132n.7
36.1-2: 47n.45
89ff.: 119
89.1: 123n.49,184n.31
89.2: 104
96.1: 179n.21,180
97: 47&n.45,110n.19, 128n.62
99.3: 30,119n.38,126n.55
122.3-123.1: 147
144: 9
144.1: 140
144.1-2: 8n.6
144.2: 151,152n.59,163
158.4: 161n.77
163.2: 47n.45
168.2: 161n.77
168.4: 7
179: 179n.21,182
184.1: 130n.1,137n.21,139n.27,
170&n.2,171
184.3: 47n.45
194: 126n.55
194.1: 118n.34
195: 126n.55
VIII 1-17: 149
1: 155n.67
1.1: 106
1.1-2: 149,151
1.2: 47n.45
2.1: 47n.45
10.1: 179n.21
14.1: 149,151
14.2: 119n.37

17: 20n.23,171
22.1: 130,179n.21,180
42.2: 179n.21
46.1: 179n.21,180
46.4: 47n.45
48: 47n.45
66: 184
67.2ff.: 119n.38
87.4: 156
90.2: 136
93.2: 156
111-112: 146
118.1: 119n.37
121.1: 51n.59,119n.37
130.1: 118n.34
130.2: 119n.37
IX 96.1: 116n.28
Hesiodos (Hes.)
*Op.*618-694: 44n.37
628: 39
643: 12n.14
Hesychios (Hsch.)
s.v. δίκροτος: 52n.62
ναύκλαροι: 17n.14
Σαμιακὸς τρόπος: 44n.38,94
Hipponax
F 28W: 103
Homeros (Hom.)
*Il.*I 308-311: 39
309: 40
II 509f.: 40
637: 16
719ff.: 40
719-720: 175n.12
IV 143: 55n.75
XI 227: 55n.75
*Od.*I 180-186: 39
280: 40
425: 55n.75
II 212: 40
383-385: 17n.14
386-387: 16
414-434: 39
III 320-322: 92n.66
IV 310: 55n.75
634-637: 39
669: 40
842-847: 39
V 38: 36n.13
77-78: 93n.71
163ff.: 36
174-176: 37
244ff.: 37
255: 37
256-257: 62
278: 93n.70
322-323: 94
VII 267: 93n.71
VIII 34ff.: 40
161-164: 3,39
161: 4n.3
IX 322-323: 3,33n.1,41n.30,42
XI 11: 93n.71
192ff.: 3n.2
XIV 245ff.: 3n.2
252ff.: 92n.66,93n.70
XV 403-484: 44n.37
XVII 248-250: 44n.37
Horatius (Hor.)
*Carm.*III 29.62: 52n.63
Inscriptiones Graecae (*IG*)
II[2] 1623.276ff.: 177
1623.284: 179
1628.154f.: 171
Isaios (Is.)
XI 48: 20n.23
Josephos (J.)
AJ IX 283-287: 127
285: 128 n.62
*Vit.*XV: 92n.68
Justinus (Just.)
II 9.20: 138n.26
12.12: 149
XLIII 3.4: 71
3.5: 34n.7
Kleidemos
FGH 323F21: 156n.68
Ktesias
FGH 688F13.20: 132
Livius (Liv.)
XXIV 40.2: 52n.62
XXXIV 21.7: 70n.21
35.5: 47n.46
XXXVIII 38.8: 47n.46
XLV 35.3: 51n.61
Lucanus
III 534: 52n.62
Lukianos (Luc.)
*Am.*VI: 52n.62
*Cat.*XIX: 57n.81
*Cont.*I: 57n.81
*Nav.*VII: 35n.10

IX: 96
*Syr.D.*XXXI: 55n.75
VH I 5: 47n.46
LXX (*Septuaginta*)
*Ez.*XXIX 18: 114
Lysanias of Mallos
FGH 426F1: 119n.36,134
Lysias (Lys.)
XXI 2ff.: 180
6: 179n.21
Lysimachos
FGH 382F7: 93
Marmor Parium (Marm.Par.)
FGH 239F9: 45n.43
42: 103n.2
ML
no.23,6-7: 173&n.8
14: 151
18-22: 156
27-28, 31-32: 171
Meleagros (Mel.)
EG 4351: 42n.32
Memnon
FGH 434F27.2: 47n.45
Menandros of Ephesos (Men.Eph.)
FGH 783F4: 128&n.62
F7: 114
Nepos
*Dat.*V 1.5: 124
*Milt.*II 5: 146
III 1: 148n.49
VII: 146
VII 3-4: 147
3: 119n.36
*Them.*II 1-2: 149n.50
2: 149
3.4-8: 149n.50
8: 149,163
Nikolaos of Damaskos (Nic.Dam.)
FGH 90F65: 86n.54
Nikostratos (Nicostr.Com.)
fr.9.1K/A: 42n.32
Novum Testamentum (NT)
*Act.*27: 35n.10
37: 92n.68
Pausanias (Paus.)
III 6.5: 110n.20
Phanodemos
FGH 325F22: 123n.49
Philistos
FGH 556F68: 26n.35
Philo
*Migr.Abr.*148: 35n.10
Philochoros
FGH 328F8: 19n.19
F48: 18&n.16
Photios
s.v. Σαμίων ὁ δῆμος: 96n.77
Pindaros (Pind.)
*P.*IV 245: 45
Plato
*Leg.*IV 706c: 121n.43
*Menex.*240a7: 138n.26
*Ph.*58a7: 18
85c-d: 37n.14
Plautus
*St.*367-368: 110
Plinius (Plin.)
*Nat.*VII 207-8: 112
XVI 192: 152n.62
XXXIV 149: 70n.21
XXXVI 11: 103n.2
Plutarchos (Plu.)
*Cim.*XII 2: 177
5: 119n.36
XVIII 6: 119n.36
Dio XXV: 93n.71
*Galb.*XXVI 5: 35n.10
*Mor.*302a: 86n.54
419b: 35 n.10
861b-c: 134
*Per.*XI 4: 122n.45,185n.32
XXVI 4: 96n.77, 93
XXXV 2: 20n.23
*Them.*III 5: 149n.50,158
IV 1: 149
2: 140,149n.50,158
3: 149
4: 121
VI-VII: 30n.43
VI 5: 162n.80
VII 6: 156&n.68
X 6: 156n.68
*Thes.*XXII 1: 18
Polyainos (Polyaen.)
I 23: 108n.15
30.6: 149&n.50,162
III 11.13: 53n.66
VII 2.2: 86n.54
Polybios (Plb.)
I 20.9: 152n.62
20.14: 47n.45

I 73: 46n.45
II 3.1: 47n.46
XII 25*f*.1-2: 119
Polydeukes (Poll.)
I 82: 46n.44
I 87: 55&n.76
VIII 108: 17
Polykleitos of Larisa
FGH 128F3a: 126n.59
Proklos
*Chrest.*XXXI: 103n.2
Simonides
XXI Page: 138n.26
88a Diehl: 138n.26
88b2 Diehl: 138n.26
90 Bergk: 138n.26
Sophokles (S.)
*Ant.*804: 55n.75
Stesichoros (Stesich.)
PMG 184: 70n.14
Strabo (Str.)
II 3.4 C99: 47n.45
C100: 131n.6
III 2.5 C144: 35n.10
III 4.6 C159: 70n.21
VIII 2.1 C335: 12n.14
6.20 C378: 8
XVI 2.24 C757: 2n.1
2.25 C758: 124
Synesios (Synes.)
*Ep.*IV 165: 47n.46
Teles
p.27H.: 42n.32
Theodorides (Theodorid.)
EG 3107: 42n.32
Theophrastos (Theophr.)
*Char.*XXV 2: 52n.62
Theokritos (Theocr.)
XVI 41: 36
Thukydides (Th.)
I 4ff.: 35
4.1: 16
9.3: 16
10.4: 15,20,21,23,40,53, 92n.68,175n.12
13: 65
13-14: 20
13.2-5: 6,14
2: 13,15,31,140
3: 22,23,51n.61
4: 13
13.5: 8,28,35
6-14.2: 105
6: 21,66,78,81,98,133
14: 21n.25
14.1:8,16,21,29,40,41,46,92,133, 139,142,155n.66
2-3: 139
2: 7,21,22,30,114,161n.77,184
3: 21,46,54n.71,61,96n.77,106, 152n.62,158n.70,180n.22
16: 119n.37
22.2-3: 31
24-55: 24
25.2, 25.4: 178
27.2: 106
29.4: 178
31.1: 173,178
35.3: 173,178
45.1: 173
46.1: 173
47.1: 173,178&n.18
3: 178n.18
48-51.3: 24
48.4: 24, 179n.21,180
49ff.: 80
49.1-3: 6,172
1: 26
2: 25n.31
4: 178
5: 24
6: 24,179
7: 17
55.1: 178
93.3: 157
100.1: 177
112.1-4: 177
116.1,3: 119n.37
143.1: 180
II 7.2: 135n.16
56.2: 172
83.5: 25,177,179n.21,180
90.2: 25,179n.21,180
III 16.1: 175n.12
18.4: 79n.40,93
IV 118.5: 25,52,64
VI 8.1: 171
26.2: 66n.1
31.1: 174
2: 183
3: 182n.26
34.5: 93n.70

43: 46,47n.45,137n.22,167n.1, 171, 175&n.12,177
50.1: 20n.23
2: 174
61.6: 20n.23
91.4: 79n.40,93,175n.12
103.2: 47&n.45
104.3: 175n.12
VII 1-3: 175n.12
1.3: 79n.40
23.2: 179n.20
25.6: 92n.68
31.5: 179n.21
42.1: 177
VIII 16.1: 167n.1
29.2: 171
46.1: 119n.37
61.2: 167n.1
62.2: 175
73.2: 175
74.2: 176
86.9: 176
104.3: 179n.21

Timaios
FGH 566F149: 55n.75
Vitruvius (Vitr.)
I 2.4: 40n.25
Xenophon (Xen.)
*An.*II 4.28: 36
IV 1.15: 132n.9
V 1.15: 47n.45
VI 6.5: 47n.45
22: 47n.45
23: 47n.45
*Cyr.*VIII 1.32-45: 97n.78
HG I 1.5: 171
36: 175
2.1: 175n.12
5.20: 173,180
6.16: 180
19: 180
24-26: 173
III 1.7: 97n.78
4.25: 88n.58
V 1.23: 12n.14
VI 2.12,14,27ff.: 122n.45
*Oec.*VIII 8: 130n.1,174n.9

GENERAL INDEX

Adriatic 67n.4
Phokaian exploration 67
aeinautai 17&n.13
Eretria, Miletos 17
Aemilius Paullus, L. 51n.61
Africa, Westcoast of 80
Agamemnon 16
Aigina
and Egypt 86
and mercenaries 98
late-archaic sea-power 133
naval backwardness 141
navy insignificant 7f.,21f.
reason building trireme 141
triremes in navy 106
Akê-Acco 124
Alalia, date 75n.33
earlier battles? 74n.32
near Etruscan mines 70
Aleian Plain
naval base Persians 135
Alkibiades 20n.23
Alyattes of Lydia 66n.2
Amasis, see also Saïte dynasty
allied with Croesus 97n.78
allied with Polykrates 85f., 88, 90,115
ambivalent policy concerning foreigners 76
anti-Persian measures 115
occupies Cyprus 108f.
philhellenism 76n.35
renounces alliance with Polykrates? 99
sends troops to Lydia 97n.78
trireme 103,117
Ameinokles, Corinthian shipwright 13,23,51n.61
Amisos
near mines Chalybes 70
Ammonias, sacred trireme 18
Antigonis, sacred trireme 18
Antiochos of Syracuse 82n.44
Apries, see also Saïte dynasty marches against Sidon 114
naval conflict with Tyre 114
Areopagos
and decision to build more triremes against Persia 163n.81
Arganthonios 69f.
date invitation to Phokaians 75
pays for Phokaian walls 75n.33
trade with Phokaia 70ff.
Ariaramnes, satrap of Kappadokia
raid on Skythia 132
Aristonothos vase 3,5,33,45
ships on vase 5
merchant galley painted 63n.96
Artaphernes I
expedition to Naxos 133
Artaphernes II
campaign of Marathon 137f.
Artemisia
in Xerxes' navy 119n.38
Persian peace-time patrols 126n.55
Aristagoras of Miletos
Naxian expedition 133
and Sardinia 83
Assyria
operations in Phoenicia 128
subsidizes naval mobilization Phoenicians 128
Athens
assembly and decision to build more ships against Persia 162
buys twenty Corinthian ships 19,23,26f.
citizens to be kidnapped in 490 BC 138 and n.23
compared with modern powers 9n.8
decision to build trireme fleet 30
discussion Themistokles' proposal in 493 BC 7f.,145n.43
financial reserve used for building ships after 483 162
a hundred rowers in navy of 480 BC 171,173
involved in Ionian revolt 133
late-archaic navy 133
means to finance offensive warfare 145f.

naval insignificance 7f., 21f.,141
naval power and potential allies 7,155
Persian danger disregarded in 483 BC 158,160
reaction to Persian threat of 483 BC 162
Sicilian expedition undermanned 174
splendour Sicilian expedition 182f.
state-owned ships 19ff.
unaware of Persian danger in 483 BC 158ff.
undermanning triremes 173f.
Athos 137
digging canal started 160
auteretai 80 n.40,175n.12

Babylonia
conquered by Persia 85
replaced by Persia 115
secedes from Persia in *c.*517 131
Bacchiads 16n.9
exploit *emporion* Corinth 28n.39
Bebrykes
relationship with Phokaia 71
Bias of Priene
Croesus' navy 78
Sardinia 83
bronze
in exchanges Tartessos-Phokaia 70
Byblos
kbnt-ship 104&n.6

Carthage 15
activity in Sicily and Sardinia 75
beginnings of empire 75
destroys Tartessos 72n.24
invention of *tetrērēs* 112f.
long preparations against Phokaia 147
naval innovations 83
opponents Phokaia 74,83
Phokaia-Massalia 82
sea-battles Phokaia 66
trikrotos galley 111
trireme 103f.
Chios 66f.
late-arhaic sea-power 133
Oinoussai 77n.37
Thraco-Macedonian silver 77n.37
Churchill 11
Cilicia
chief naval base Persians 123n.47, 124,131n.3
starting place Persian naval expeditions 124
id. campaign of Marathon 138
Cinque Ports
analogue to *naukrariai* 17
Clement of Alexandria
invention trireme 112
sources 112
trikrotos galley 113
colonization
Strait of Messina 45
Syracuse 45
Corinth 6,8,13ff.
almost abandons use naukraric ships 28
builds first katapharkt pentekontor 23
corn import 43
dikrotos oarage 79
emporion 14
first to adopt modern-style naval organization 28
first to build triremes in Greece 140
first trireme 31
friendship with Athens 155
great number state-owned ships 106
most important naval power in Greece after Athens 26
large navy archaic period 8,23f.
law regulating sale naval ships 19,26f.
leads naval development 13ff.
'lend-lease' transaction with Athens 26f.
modernization navy and colonial expansion 27f.
modern organization navy 106
naval potential in 483 BC 159
naval power 21,106
naval precocity 28
naval tactics 5n.4,80
naval war with Korkyra 23f.,83
navy dependent on state-owned ships 28f.

ninety triremes in sea-battle of Sybota 173
only purely Greek sea-power of note in archaic age 106
pioneer development early *nautika* 13ff.,66
recruits foreign rowers in 433 BC 173
sale naval ships to citizens 26
sells twenty naval ships 23,26f.
state-owned navy expanded 28
technical lead assumed 14
trade by land 14n.4
Croesus
alliance with Amasis 97n.78
plans to build navy 78
Cyprus 176,182
Egyptian naval base 116
lack of ships in Ionian revolt 121f.
manning of Persian ships 121f.
naval resistance against Egypt 108f.
occupied by Amasis 108f.,114f.
proposal to man Ionian ships 121f., 121n.44
Cyrus
war with Ionians 66
Cyrus the Younger 88n.60

Danube
bridged by Persian navy 132
Darius
death dates breakthrough trireme 105
fiscal organization empire 135&n.15
Greek sea-powers of before his time 66
plan to conquer Greece 159f.
propaganda concerning Oroites 88
strategic forethought 131&n.6
supposed preparations after 490 BC disregarded by Athenians 160
three years preparation against Greece 160
tributary system 126n.59
Datames 124
Datis
campaign of 490 BC 137f.
Delian league 78
leads to structural innovations 82
peace-time patrols 119,122n.45, 185n.32
training of crews 122n.45
Demetrias, sacred trireme 18
Demetrios Poliorketes 51n.61
Demokedes of Kroton 131
Dionysios of Phokaia 6,73
not in command at Lade 73n.30

Egypt 85ff.
conquered by Kambyses 87
defective information concerning navy 117
disaffection in the navy? 123&n.48
and first Persian conquests 115
invention *trikrotos* oarage 115
invention trireme 108,116
mercenaries 85ff.
id. in Ptolemaic times 91n.63
military collaboration with Lydia 97
naval side of conflict with Persia 130
navy and Kambyses' attack 122n.46
and Phoenician Cypriots 115
sea-route to Aegean 92
eikosoros 41ff.,63
analogous to mediaeval merchant trireme 43
between galley and sailing ship 45
big merchantman 42&n.32
Gray's view inverted 43
hatches 44&n.38
in long-distance trade 49
oars serving as auxiliary motor 43
painted by Aristonothos? 45
parexeiresia 56
stage in development sailing ship 43
two types? 63
widened 43f.
Elea 68
Emporion 70
Ephoros 118f.
local Kymaian tradition 118,135
merits as maritime historian 119
Persian naval organization 118f.
Epidauros 22
epôtides (catheads) 59n.86

Eretria
  aeinautai 17
  citizens to be kidnapped by Persians 138&n.23
  ignored as sea-power by Thukydides 106
  involved in Ionian revolt 133
  overrun by Persians 143
  threat to Persia in 490 BC? 143
  triremes in 499 BC 106,133
Etruscans 15
  alliance with Carthage 68n.6,75
  long preparation against Phokaia 147
  opponents Phokaia 74,82f.
  routes from Aegean to 67
Euboia
  naval power ignored by Thukydides 106
Eurymedon 176,182

fighting deck 53ff.

galley (see also merchant g.) 1,4al.
  Basch's view of true Aegean 'longship' 60
  biremes with *c.*100 oars? 40n.29
  Boiotian g. in Homeric catalogue 40
  cargo capacity 25&n.33
  dikrotos galley 48,50f.,53ff.,55,59
    as a class 64
    Casson's view of genesis 53f.
  diversity within types 47n.46
  fifty oars upper limit in archaic period 41
  fifty-oared in Homer 40
  forty oarsmen maximum in earlier pictures 40
  four important innovations 45
  Homer's average g. 38f.
  Homer's general purpose g. 39,63
  importance for merchant shipping 34
  increase cargo capacity = increase in length? 42n.31
  later importance ignored 39
  life expectancy 125&n.53
  monokrotos galley 46,48f.,52f.
    as a class 63
    with *parexeiresia* 63
  g. with more than fifty oars unknown in archaic tradition 40
  numbers of oars in pictures 39n.24
  open g. and grain transport 44n.37
  passenger *dikrotoi* 53&n.63
  Philoktetes' fifty-oared g. 40
  Phoenician *dikrotos* g. 59
  Phoenician g. with *parexeiresia* 60
  predominant in archaic period 39
  predominant in geometric period 33
  small 12n.14
  state-owned *dikrotos* 64
  technical development clear-cut 20
  trikrotos invented in Phoenician world 112
  trikrotos with 72 rowers 111
  twenty-oared in Homer 40,63, 94n.74
  war galley 1
  widened for cargo space 43f.
  zugian oar reintroduced in *dikrotos* 56
Greeks
  concern with aims of Persian empire 140,144,158f.
  informed of full extent of Xerxes' preparations 161n.75
Gyges
  assists Psammetichos 97
  sends forces to Egypt 86

Halikarnassos
  peace-time patrols Persian navy 119n.38,120,126n.55
Hanno 80
hatchways 44&n.38
Hellespont 136
Heraion in Samos 49
  ship dedication stereobate 49f.
  ship dedication and Ameinokles' four ships 51n.61
Hermione 22
Hipparchos Charmou 9,11
Hipponax 103&n.2
Histiaios
  and Sardinia 83
  and Thasos 142
hekatontoros 46&n.44
Herodotos
  and Persian naval organization 119

Ed. Meyer on his figures for the Persian navy 183
holkas 36f.
horse transports 137n.22
in Xerxes' fleet 110n.19
rowed by thranites of trireme 171n.5
sixty-oared 171
hoplites
ek katalogou 90,175n.12
Hyele (Elea) 68

Ionian revolt 133,143
naval operations 134f.
Persian losses 135
Ionians
claims on Pangaion area 144
in Egypt 90
fleet at Lade 184
meaning of term in Th.I 13.6 67
sea-power eliminated 136
war with Cyrus 66
Iphikrates
training of crews 122n.45

Judah
crushed between Egypt and Babylonia 114

Kambyses 66
alleged plan to conquer Carthage 83,130
conquers sea 118
cost of navy 125ff.
counters threat Egypt 118
creator Persian navy 118
desired strength navy 123
Egyptian expedition 104
naval forces in 525 BC 131
number of ships in 525 123
plan for attack on West 130,162
reason creation 'Persian' navy 120f.
subjection of Egypt 130
tributary despot 126n.60
Karians
in Egypt 89,90
Karystos 139n.27
kataphraktos 21,23
meaning of term 53&n.65
kerkouros
carrying capacity 109
etymology term 109n.18
grain-carrying galley 109
in Xerxes' fleet 110n. 19
modernized after Greek or Phoenician model? 110
no Achaimenid or Ptolemaic innovation 110
oarage 110
Kimon
alterations in triremes 177n.15
Cyprian expedition 176f.,182
expedition to Eurymedon 182
kings
perquisites 13n.1
ships 16,20
Kleinias 20n.23
trireme and crew 171
Kolaios 70,72,79
dedication in Samian Heraion 72
and service in Spain 72
and Tartessos 70
trade with Spain 72
Konon 174
undermanned triremes 173
Korkyra
naval tactics 24f.
naval war with Corinth 23
slaves as rowers 178&n.17
triremes 7,21f.
Kydonia 96n.77,141
samainai at K. 141&n.31
Kyme
naval base Persia 118&n.34
and Phokaia 77n.38
Kypselids
and invention trireme 14n.5

Lampsakos 71
Laureion 150
Lesbos 133
ignored as sea-power by Thukydides 106
Luli II of Tyre 30,59
Lycia 117n.30
Lydia
alliance with Egypt 86
conquered by Persia 86
mercenaries 86&n.54
military collaboration with Egypt 97&n.78

naval rivalry with Miletos 78
no navy under Alyattes 66n.2
Lygdamis
aids Polykrates 108n.15
Lysanias of Mallos 134f.
and naval organization Persia 119n.36

Makartatos 20n.23
Marathon 137f.
Greek naval potential 139
Persian armada modest 138&n.23
Mardonios 136
fleet overawes Thasos 137
Maroneia 150
Massalia 66,82
foundation 71,82
location near tin road 70
and Phoenicians 82
'Mede'
threatens Ionia 75
Megakles 11
Megara 22
Menestheus 19
mercenaries 85
Aegean in Egypt 90
Aegean in Lydia 86,90
Aiginetans middlemen? 98
bronze men 90
duration of service 91&n.64
marginal citizens in *poleis* 90f.
middlemen other than Polykrates 98
Milesians as middlemen 98
numbers 91f.&n.65
organization of recruiting and transport 93
pattern of service 89f.
Phokaians in Tartessos 71
Polykrates middleman for Egypt 87
recruitment area 86
slipways of their ships 90
and Spain 75
stratopeda 90
and Tartessos 74,76,81
time of first engagement in Spain 75
transportation 89ff.
wages and trade 77
merchant galley 2,4,8
ability to compete with sailing ship 36
armed 17&n.12,21
armed m.g. unknown in Thukydides' Athens 21
fitted with deck 44
fitted with hatchways 44
naval service 16ff.
and Phoenician sea-power 30
ram essential accessory 38
and sailing ship: Casson's view 39n.21
Miletos 67,133
aeinautai 17
and Egypt 86
and mastery of the sea 78
and mercenaries in Egypt 98
naval power and Naxos 108
navy not in evidence 66n.2
subject to Persia 84n.48
wintering place Persian navy in 494 BC 136
Miltiades
anti-Persian version of earlier policy 145
chance to dislodge Persians from Thrace 147
and control of Pangaion area 145
compared with Polykrates 147
escape from Persians 143
experience in Persian empire 144
funds for Pangaion campaign insufficient 145
and Ionian revolt 143n.42
necessity to extort funds 145f.
Parian aventure 8,145ff.
political ambitions in North-Aegean 144ff.
promises to make Athenians rich 145&n.45
purpose of attack on Paros 145
sent to Chersonese in trireme 142n.36
seventy ships not triremes 19n.21, 146
siege of Paros 119n.36
tactics in battle of Marathon 144
triremes in Chersonesos 143
triremes in Skythian expedition 143n.41
Minoan/Mycenean seafaring 3

Minos 16
Mitrobates 88&n.60
Myrkinos 143
  claimed by Ionians 144
Mytilene
  contribution to Kambyses' fleet 130n.2
  and Polykrates 98
  trireme with Mytilenaian crew in Memphis 104n.3
  trireme in Kambyses' fleet 130&n.1

nauklêros 3,72n.26,91
naukraria 3,4n.3,17f.
  analogous to Cinque Ports 17
naukraric ships
  ignored by Morrison 29
  only units in pre-483 Athenian naval arm according to Kahrstedt 18
  not in navy of rebellious Ionians 133
  in Phoenicia? 30
naukraroi 17&n.13
  buy ships of *polis* in Corinth 26f.
  furnish one ship each to *polis* in Athens 17
  and mercenary service 91
Naupaktos 25
naval installations
  for Kambyses' navy 124
  larger for trireme 111
naval organization
  development leads to technical specialization 22f.
  development veiled in tradition 20
  distinction state-owned/privately owned ships 20
  financing mobilization 8
  pioneering by Corinth 13ff.
  predominance state-owned ships in Corinth 28
  scrapping and selling naval ships 27
  similarity Corinthian and Phoenician? 29
  small scale in Greece before 483 BC 186
  stages development 15f., 31f.,105f.
  supposed similarity of Persian and Roman 120
  transition to predominance state-owned ships 101
  two developments, technical and organizational 20
naval tactics 6,24f.,73f.
  compared with hoplite tactics 25n.31
  co-ordination state-owned and naukraric ships 23
  Corinthian/Korkyraian routine 24
  diekplous manoeuvre 6,24,73
    Morrison's view 74n.31
    not common practice 6,172
    numerous crews needed 172
    Phokaian invention 74
    regular fighting precondition for invention 74
    regular training required 107
    traders as inventors 80
  non-ramming concept 6,24f.
  ramming-tactics late innovation 107
  striking forces 24,25&n.31, 179
  tactical backwardness 26n.35
naval warfare 4f.
  rarity of 38&n.16
navies
  Aigina 21f.,141
  and archaic economy 8,29
  archaic 16ff.,29
  Athens 21f.,25
  Corinth 29
  era Darius 16
  exclusive use of state-owned ships 20
  Greek *poleis* Asia Minor 66f.
  high cost of training 26n.35
  infrastructure 8,30
  Korkyra 22
  naukraric ships in Corinth 26ff.
  Phoenicia 29f.
  standing navies 82
  state-owned and naukraric ships at Naupaktos? 25
  state-owned ships prevalent in archaic Corinth 29
  supposed of all time 4f.,29
  Trojan period 16
  Greek *poleis* in West 7,22

navigation
by the stars 2n.1
sailing course Egypt-Aegean 92n.67
working to windward 2f.,34f., 35&n.10
Naxos
aristocratic coup 132f.
citizens to be kidnapped in 490 BC 138&n.23
competing with Ionians in northern trade 143
ignored as naval power by Thukydides 106
naval power 108n.15,142
no military threat to Persia in 490 143
Persian attacks 108,138
Naxos (Sicily) 174
Nebuchadrezzar 114f.
Necho 85&n.52, see also Saïte dynasty
creation navy 85
strategy 85
triremes in navy? 103ff.,128f.
Nepos
and Miltiades' Parian adventure 146&n.47
and Themistokles' navy bill 149,152n.60
Nikodemos (archon 483-2) 152

oarage
assumed origin of *dikrotos* o. 53f.
a zenzile system 93n.69
date genesis *dikrotos* o. 59
development *dikrotos* o. 53ff.
dikrotos o. in Casson's view 48n.50,53f.
dikrotos oarage essential for state-owned ships 52f.
dikrotos o. and pirates 52
dikrotos o. and 'passenger' capacity 79&n.41
genesis 'Athenian' *dikrotos* system 55
genesis *dikrotos* o. according to Casson 53f.
length o. compared with length of ship 49f.&n.55
thalamian/zugian system 57
thranites rowing transport triremes 111,171n.5
zugian/thranite system 63
oars
addition second bank 23
different length? 54
same length 54,181n.25
origin thalamian bank 111
origin thranite bank 44,55f.
original zugian bank 55
oarsmen
all trained men in trireme 169
auteretai soldiers 79f., 175n.12
banks trireme derived from pentekontor 49n.54
extra pay for thranites 181
100 o. in Athenian triremes of 480 BC 171,173
moved to ship's side in decked galley 44
number adapted to ship's task 52,171f.
number variable in transports 172,177
passengers as o. 57n.81
placed on benches in decked galley 44
quality not determining factor in speed 180
reshuffling and attunement 181
reshuffling and tactics 182
seated near middle of *monokrotos* galley 44
shifting 181ff.
slaves in Korkyraian crews 178&n.17
teams of room-mates 181n.25
terms '*zugios*' and '*thranites*' may be early 64
thalamian 53ff.
last added 111
added in 'Sidon' 113
risks 181n.23
thranite 44f., 53ff.
associated with deck 55n.76
greater risk? 181n.23
foremen in room 181
work harder? 181n.23
thranos 44
zugians and thalamians promoted to thranite oar 181n.25
zugios 53ff.

Odysseus 16
Oinoussai islands 77&n.38
Onesilos of Salamis 134
Oroites, satrap in Asia Minor
  eliminates Polykrates 87
  instructions 88
  rebellious against Darius? 88n.59
  reinforcement of armed forces 85
  seen as rival by Darius 85, 87
Otanes
  conquers Samos 131
  naval expedition 131&n.3

Palestine
  subjected by Persia 85
Pangaion area
  reason Persians to subject Thrace 143
Paralos, sacred trireme 18,19n.18
  crew sent on guard duty in *stratiôtis* 175
parexeiresia 14,50f.,56ff.
  advantages 56,58f.
  and assumed origin of *trikrotos* oarage 54
  and *epôtides* 59n.86
  in geometric pictures 57f.
  invented before 750 BC 59
  invention 59
  Mycenean? 65
  restricted to Greek world? 59f.
  and screens 61f.
  universally adopted 59
  unknown to Phoenicians? 59
Paros
  attacked by Miltiades 119n.36,145ff.
Peisistratidae
  use trireme to bring Miltiades to Chersonesos 142n.36
Peisistratos
  aids Lygdamis 108n.15
  and naval power 84
pentekontor 16,45ff.
  adequate for *diekplous* tactics 107
  in Black Sea area in 512 BC and later 132&n.9
  cargo capacity 25&n.33
  Casson's view 46
  conversion to *trikrotos* oarage 111f.
  Corinthian type 23,106n.11
  crew merchant p. 81&n.43
  dedicated in Samian Heraion 51
  dikrotos p. as wide as trireme 50
  Gray's four 'possibilities' 46
  in Homeric fleets 40
  hyperesia of p. 72
  katapharkt p. 21,23,64
  less suited as transport 183
  in management of states 47
  as merchantman 34,68
  minimum crew 72
  monokrotos predecessor of trireme? 47
  number oarsmen adapted to p.'s task 52
  Phoenician type 113
  Phokaian p. 67ff.,111
    superiority 15,103
  Phokaian p. functions as round ship 34,68
  Phokaian p. provided with ram 38
  predominance in Corinth's navy 29
  qualities *dikrotos* p. 48
  qualities p. 52
  replaced with triremes in Greek *poleis* 141&n35
  seaworthiness 95n.76
  not specialized as warship 53&n.64
  transport capacity not needed by archaic *poleis* 108
  and treaty clause of 423 BC 52
  used in Skythian raid of Ariaramnes 132
  width identical with Samian ship stereobate 51
  in Xerxes' expedition 110n.19
pentekontoros 20,41
  meaning of term 46ff.
  term dated by Homer's *eikosoros* 64
  term late in literary record 45
Penthylos of Paphos
  and peace-time patrols of Persian navy 126n.55
Perikles 20n.23
  on reasons superiority Athenian navy 180
Persia
  and alliance Polykrates-Amasis 88
  creation navy 118ff.
  foreign policy in coastal area 142f.
  and free Phoenicians in

confrontation with Egypt 115
heralds sent in 491 BC 139n.28
land forces in 480 BC 161&n.46
losses in Ionian revolt 135
naval effort 480 BC determined by Greek potential 161&n.77
Naxian expedition 120n.41
oarsmen available in empire 170
policy in Aegean 144,161
position in Thrace in 490 BC 147
reaction to Themistokles' navy bill 158ff.
routine troop and ship movements 160
threat to Greece? 158f.
threat to Ionia *c*.547 BC 75n.33
threatened by triremes of Egypt and Polykrates 117
tribute Greek coastal subjects 143
and western Mediterranean 83, 131
Persian navy
accounts Ephoros and Lysanias 118f.&n.36,134
Aegean fleet 122n.45,133
auxiliary ships in Black Sea area 132
chief base in Cilicia 124,134
consisting of royal ships 119
cost of creation 125ff.
costs per annum amount to money income empire 126
created by Kambyses 122
expedition to Naxos 108&n.15
expedition to Samos 131
no flagshowing 140
fleet at Lade 135f.,184
fleets of 600 ships 132&n.7
fleets of 300 ships 123&n.49
full exploitation potential in 480 BC 162
in full force in 490 BC 137f.
Herodotos' figures for 480 BC 170,183
Herodotos' formula for organization inadequate 120
initial financing 125
initial strength in 480 BC 184n.31
infrastructural works 122ff.
Ionians, Aiolians, Hellespontines bring up to Danube 132
Levantine fleet 122n.45,131, 134
line-of-battle potential at Lade 184
location bases 124&n.50
naval installations in Cilicia 124&n.51,134
naval service subjects and compensation 119
number of oarsmen triremes doubted by Ed. Meyer 170
numbers of ships 117,123,183ff.
number of ships in Datis' fleet 137ff.,183
number of ships in Egyptian expedition 123
offensive in Ionian revolt 135
organization different from traditional view 120ff.
organization not analogous to auxiliary system Rome 120
organization suggested by Herodotos 119
peace-time patrols 118n.34, 119,126n.55
reserves in Xerxes' fleet 161
600 ships in ordinary levy 185
skeleton crews at Lade 136
strength in campaigns 123n.49
supposed similarity to Delian navy 120
system of finance lackingunder Kambyses 126
no weapon like Romanboarding-bridge in 525 BC 123
winters at Miletos in 494-3 BC 136
Xerxes' 1200 triremes 184
Phaiakians 3
Phanes of Halikarnassos 86
chased by trireme 103,117
defects from Amasis 130
Philippos of Kroton 20n.23
Philostephanos of Kyrene 112
source of Clement of Alexandria 112
his informants on *trikrotos* ships 113
technical quality terminology 113
Phoenicians 74
activity in Sicily and Sardinia 75
after Salamis and Mykale 116n.28
Assyrian subsidies for naval mobilization 128

between Egypt and Babylon 114
collaborate with Assyria against Tyre 127f.
crews triremes according to Hammond 126n.56
and invention of *trikrotos* oarage 114
man new Persian navy 123
man Persian fleet in 494-93 BC 136
manpower and Persian navy 124, 170
naval organization unknown quantity 29
navy in Thukydides 119n.37
population cities 170
supposed priority in use of triremes 31
refuse to attack Carthage 130
opponents Phokaia in West 74,81f.
political alignment after 539 BC 114
subjected by Persia 85
supposed warships in 11th century BC 127
supposed tradition of naval wars 127
supposed warships in 11th century BC 127
and Tartessos 79
threatened by Egyptian navy 116
and three-banked warships according to Torr 113
trikrotos galley 115
in Xerxes' expedition 170
Phokaia/Phokaians 6,15,66ff.
commercial accomplishments 76f.
creators *diekplous* 73f.
date exodus 75n.33
departure from Corsica 111
depredations 15,68,82f.
emigrate west 68
emporia 70
expansion 70
explore routes to West 67
financial basis naval power 78,80f.
fleet of 120 pentekontors 77f.
first Greeks to make long voyages 67
in Humphreys' concept of trade 76
and Kyme 77n.38
long-distance colonizing 70
long voyages to West 34,67
metal trade specialism 70
military aid abroad 71f.,76
monopoly of trade with Spain 98n.79
naval power 66f.,106
compared with that of Polykrates 98
and defence against Persia 78
much reduced atLade 78
original *monokrotos* galley 79
and Phoenicians 81f.
political and military prominence in Ionia in 546 BC 69
secondary trade 77
supposed pirates 34
supposed use of warships 34,68
tactical superiority 75
and Tartessos 69ff.,79
threatens trade in Tyrrhenian area 83f.,104
trade 69ff.
use of pentekontor 34,68
Phormio 25
piracy 4,35,92
Corinth and piracy 14,28
and metal trade 74
suppression 35
ubiquity 35
pirates 4,5,17
Phokaians considered pirates 34
pirate craft 20
late fifth century 21,52n.62
Pissouthnes 88n.60
Plato
on creation Athenian navy by Themistokles 121n.43
ploia makra 16,20
equivalent to 'armed merchantman'? 21n.24
heterogeneous category 29,63f.
in Homeric fleets 40
Polykrates 66
aided by Lygdamis 108n.15
alliance with Amasis 86f., 88,116
its potential 85&n.53
career 84,86f.
chronology 28n.40
conquests on continent 85
continues Amasis' policy 147

dependent on Egyptian subsidies 100
eliminated by Oroites 87,100
envoy sent to Kambyses? 99n.81
extortions 84,147
falsification of tradition 87
financial basis naval power 84
40 triremes 103,117
100 pentekontors 21f.,84,87
= 100 *samainai*? 97
middleman mercenaries 86,88
and Mytilene 98
naval power comparable with that of Phokaia 78,98
navy 84,87
piratical activities 95
power based on trade? 84
power not strictly 'Samian' 96
pretended support to Kambyses 99&n.81
propaganda 87f.,99
raiding 84,87
services to Egypt 85,88f.
thalassocracy 100
Psammetichos 71f., see also Saïte dynasty
and mercenaries 89f.
stratopeda for mercenaries 92

raft 36n.13
ram 38
revolutionary device? 38n.17
ramming tactics 5&n.4,6
in battle of Alalia 68,73
reprisals 35&n.11
Rhegion 68
Rheneia 66
Rome
auxiliary system of naval organization 119f.

sailing routes 2,92&nn.67,68
sailing ship 1ff.
ability to work to windward 35&n.10
course from Egypt to Aegean 92n.67
late (re-)development 2f.,35f.
nomenclature 36
not in early pictures 33
transport capacity 92n.68
not used by Phokaians 68f.
Saïte dynasty
and Aigina 86,98
alliance with Lydia, Babylonia and Sparta 86
confrontation with Nebuchadrezzar 114
dependence on foreign-type galleys? 109
and fighting capacity galleys 108
Greek services to 71ff.
an introduction *trikrotos* oarage 116
and Miletos 86,98
naval requirements 109
navy 97,105
and Polykrates 85ff.,88,99
and Samos 86
sea-power 108
strategic objective 85
strategy of containment 114
and transport capacity of galleys 108
and trireme 103ff.,128f.
Salaminia, sacred trireme 18, 19n.18
samaina 93ff.
dikrotos galley 93f.
distinguished chiefly by its oarage 96
grain-carrying galley 37n.15, 95f.
at Kydonia? 96n.77,141 at n.31
merchant galley 95
new type 7
not on coins Zankle 96n.77
and pentekontor 97f.,103n.1
similar to *eikosoros* 94
similar to pentekontor 94
not warship 95
wholly decked over 94
Samians 13
exiled at Kydonia 96n.77,141
prize of valour in sea-battle of Cyprus 134
Samos 23,66
conquest of 131
and Egypt 86
and mercenaries 98
naval fame in late eighth century 14n.5
naval inactivity in time of Persian attack 131n.4
naval power 106

navy 84n.49
navy in battle of Lade 78
navy not seen as creation of Polykrates 84
sea-power 66f.
unequalled in late sixth century 143n.39
state-owned navy of four ships 22
Sandokes, hyparch of Kyme 126n.55
Sardinia 83
Sardis
attacked by Ionians 133
Saronic Gulf
context of Themistokles' navy bill 155
naval potential in 483 BC 159
naval strength in 480 BC 155
schediê 36f.
meaning of term 37n.14
Schlieffen, Alfred von 11
scouting 2
in West 34
screens 53
and parexeiresia 61f.
sea-battles
Alalia 6,15,21,82n.44
aftermath in Carthage 111,114
Morrison's view 69n.12
misnomer 68n.7
and naval strategy 115
preparations Carthage 83
ramming tactics 68,73
trireme absent 15,103
Arginusai 173
Artemision
Persian losses preceding A. 184
Carthage-Phokaia 66
Corinth-Korkyra 13
Cyprus 133n.11
won by Ionians 134
Lade
Persian effectives 136
polis navies absent 67n.3
Leukimme 24
Pamphylian sea 134
Sybota 6,24
ships undermanned 173
tactical clues 178
sea-power
Aigina 21f.
archaic variants 29
king's ships 20
privately-owned ships 17,19
small state-owned navies the rule 22
Corinth 23ff.
economic basis 28f.
Greek
adapted to Persian scale 139
development 8
genesis 31f.
early kings 16
Eretria 106
Euboia 106
foreign-based 28,101
based on general taxation 22
Homer's times 29
ships 40
Ionian *poleis* 21
Korkyra 21
Lesbos 106
Miletos 66,78
naukraric system 16ff.22
non-Greek ignored by Thukydides 31
Naxos 106
Peloponnese
fifth century 25
Phokaia 21
Samos 21
Sikeliot 21
Sennacherib 30
ship(s)
Aristonothos vase 5f.,33
Boiotia 40
120-oared? 40n.27
built for use by *polis* 50
differentiation merchantmen-warships 4
dikrotos 23
early developments 65
eighth-century types already Mycenean? 65
equipped in ancient fashion 20
equipped like pirate craft 20f.
Gray's classification of Homeric s. 34n.5
life expectancy 51n.61,125&n.53
mediaeval Utrecht s. 48n.51
monokrotos 23,46ff.,63f.
Phokaian s. state-owned? 34n.8
privately-owned 16f.

round 36
sacred 18f.
state-owned 19n.20
specially-built 36
state-owned/managed 47&n.45
in Athens 18f.
not in Homer 16
predominant in Corinth 28
specialization 22f.,53
similar to privately-owned 27
Viking s. 48n.51
Sicily
Sikeliot triremes 7,22
Sikels and Athens in 415 BC 174
Sidon/Sidonians
development of *trikrotos* oarage 112f.
and Persian peace-time patrols 30, 119f.,126n.55
standing navy? 30
in Xerxes' expedition 119n.38
Sidonioi
meaning of term 114
silver
in Phokaian trade 70
Skylax of Karyanda
reconnaissance of Indian Ocean 131
Skudra 142n.38
Skythia
Darius' expedition 132
Sostratos of Aigina 3&n.2
Sparta
armistice proposal 422 BC 25
plan to build 500 triremes in 431 BC 135n.16
Syracuse
early need of large ships? 45
large-scale export grain 45

Tartessos 69ff.,79ff.,81
and Carthage 72n.24
compared with Egypt 72&n.27
exports metals 70
history of 72n.24
and Kolaios 70
need of man-power 75
and Phokaia 69ff.,79
and Phokaian sea-power 78
Phokaian contribution to defence 80
routes to 67
wealth 70
Telemachos 16
tessarakontor 50
tessarakontoros 46n.44
thalamos 55&n.75
Thasos
and Histiaios 142ff.
builds long ships *c.*494 BC 142
danger to Persia 1 43
cowed into surrendering navy by Mardonios 137,142f.
navy 137
'strongest naval power in northern Aegean'? 142n.37
Themistokles
aims according to Ed. Meyer 8ff.
compared to Churchill 11
compared to Schlieffen 11
compared to Tirpitz 10
compared to Wilhelm II 10
creation Athenian navy 121
debate on surplus money 148
discussion of strategy in 480 BC 163
extortions 146n.46
and feud with Aigina 145n.43
and Milesian trade 145n.43
and naval potential in Saronic area 155,159
navy bill 7,10,148ff.
absence of crisis 151,158ff.
building costs 153
confusion in tradition concerning number of ships 151
date of passing 152n.62,161
decision on use of reserve money 162
estimate of maximum enemy strength 155
Herodotos as a source 151f.
Labarbe's twice 100 ships 150
local context 158
number of ships ascribed to 149
Persian danger no factor 158
Persian reaction 158ff.
reasons deposit 100 talents 153f.,156
reserve deposited outside reach rival leaders 154
strength aimed at 155

three versions tradition 148f.
part in Athenian politics before 483 BC 9
policy in 493 BC 145&n.43
according to Ed. Meyer 7ff.
supposed secrecy 153n.65
theôris (naus) 18
Thrace, Thracians
depredations 144
Persian position in 490 BC 147&n.48
thranos
gives name to *thranitês* 44n.40
tin
in exchanges Tartessos-Phokaia 70
tin road to Massalia 70
Tirpitz, Alfred von 10
Tissaphernes 88&n.58,88n.60
trade
increase long-distance t. 45
and mercenary service 72
regular trade in grain 35,45
and *eikosoros* 43n.34
scale 35&n.12
Trapezous
use of pentekontor in Xenophon's times 132n.9
triakontor 45n.42
sacred 18&n.17
triakontoros 41
triemiolia 48n.49
triêrês 20
term used for 'warship' 113, 142n.36
trikrotos
galley, Clement's testimony 113
term specifies trireme in later times 113
trireme 1,4al., see also oarage
absent at Alalia 15,101
assumed fully manned 169,176
Basch's theory of genesis 127f.
building costs in 483 BC 150, 153&n.64
built by Hippias 142n.36
built by Miltiades 143f.
in Corinth 13ff.,106,140
crew 169ff.
date first introduction into Greek navies 15,104,107
development of fifty-oared *monokrotos* galley 47f.
different sizes unknown 47f.
dogma of full crews 176
Dover's discussion of term *stratiôtis* 176
earliest literary testimony 103
effective range 116
Egyptian squadrons in Persian navy 104
Egyptian t. and Phoenician *trikrotos* galley 116
in Eretria 106,140
fast and transport t. 175
fast t. in actions against pirates 177
fast t. = ship of the line 177
few t. in archaic navies 141f.
fighting qualities 108
first Greek 13,140ff.
flexibility in use of 183
full crew 169
in Histiaios' hands 142
horse transports included in class of t. 138n.22
introduced into Greek world from outside 31
invention 14,31,107,116
and Clement of Alexandria 113
disregarded by Thukydides 31
double scaling up 107
not in Corinth 31
is not introduction 140n.30
momentum as factor in i. 108n.15
time of 105
kbnt-ship in Egypt 104
in Korkyra before 485 BC 7,21
at Kydonia 96n.77,141 at n.31
manning not uniform 177
number in Amasis' navy 117
number of oars in Athenian t. 106n.11,170
only type used in sea-battle of Sybota 24
origin in Greece and Phoenicia improbable 108
paper figures for crews 171
paradox of development 111
Phoenician t. not larger 170n.2
Polykrates' 40 t. 103,117
predecessor *monokrotos* or *dikrotos*? 48f.,107

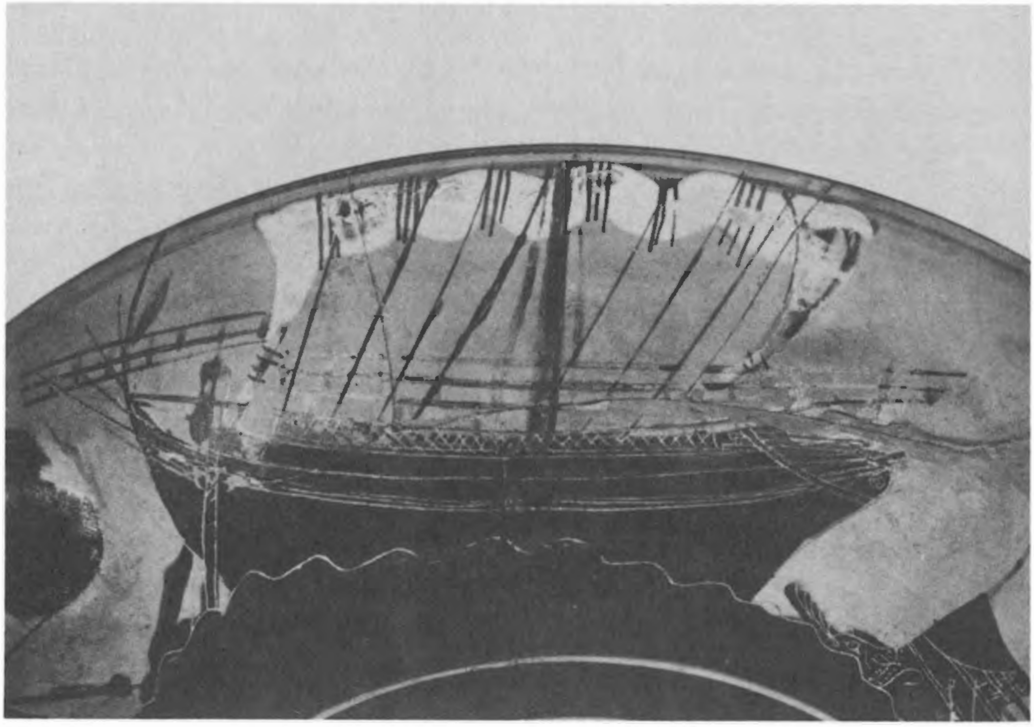
privately owned 20n.23,171
reserves included in mobilization 174
sacred t. 18,19n.18
and smaller Greek *poleis* 183
in Sicily 485 BC 7,21f.
speed
 and degree of manning 24,179f.
 and quality of construction 179
 and quality of rowers 179f.
state-owned 22
stratiôtis 175f.
 = reserve 175
 = t. with minimal crew 175
superior over *samaina* 116
superior sea-going vessel 116
tactical use of fast triremes 24,178f.
in Thasos' navy 142
tradition silent concerning Egyptian t. 117n.31
transport capacity 108
 essential quality 176
 353 t. in Ionian fleet at Lade 136,184
vulnerable 174

Tyre
 besieged by Nebuchadrezzar 114
 between Egypt and Babylon 114
 hostilities with other Phoenician cities 127
 naval conflict with Apries 114
 supported by Egypt 114
Tyrrhenian area 82

Udjahorresnet
 advisor Persian naval staff 125n.52
 commander Egyptian navy 122n.46

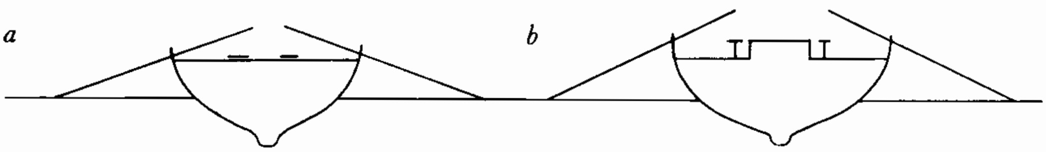
warships 4
 Basch's view of early specialization 127&n.61
 and *naukrariai* 17n.13
 preconceived notion 34
 simplistic definition 29&n.22
 supposed to be of all time 29
Wilhelm II, last German emperor 10

Xerxes
 need of fully exploiting naval levy 162
 plans in 480 BC 161f.
 three years of preparation against Greece 160

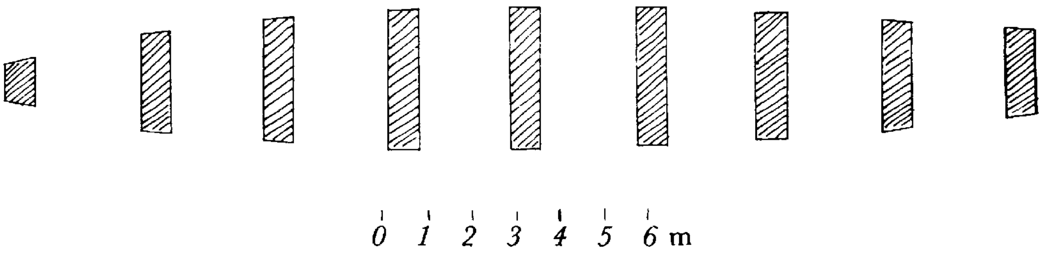


Ill. 1. Sailing ship *c.*515 BC (= *GOS* Arch.85). Photo The British Museum (B 4159).

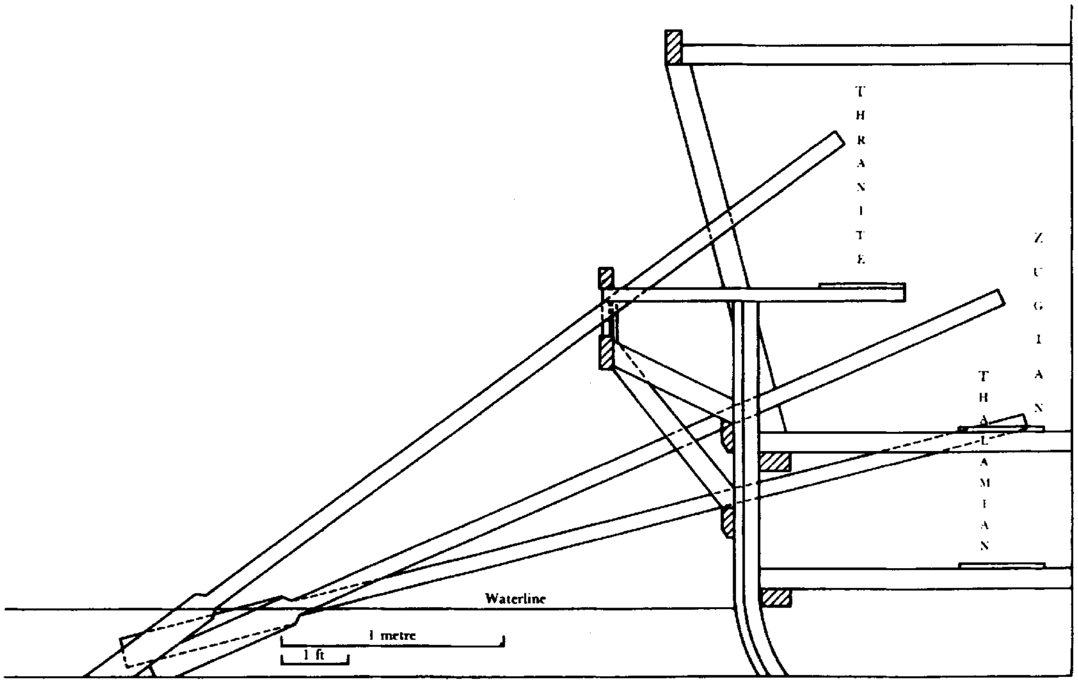
Ill. 2. Merchant galley/*eikosoros* fighting pirate (?) galley *c.* 700-650 BC (= *GOS* Arch.5). Drawing from A. Köster 1923: Tafel 35.



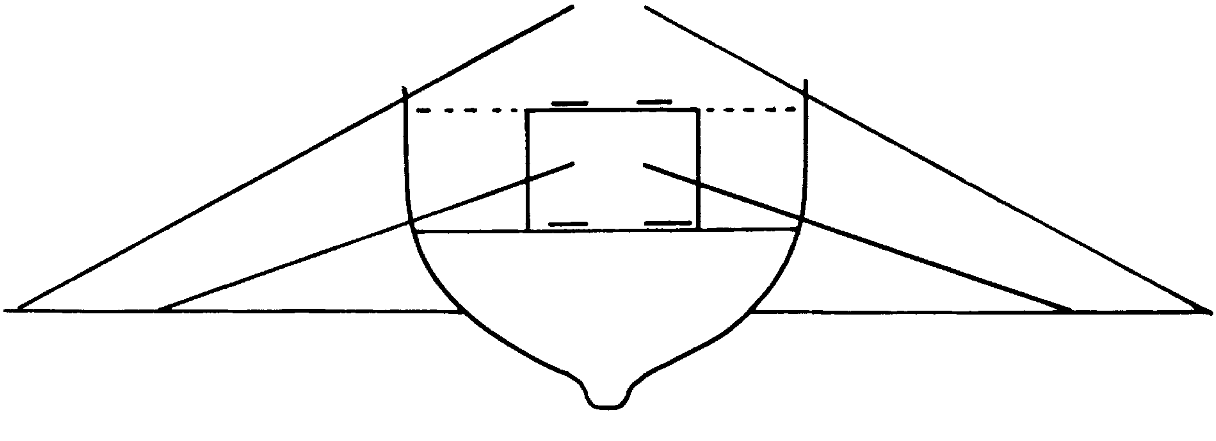
Ill. 3a. Hypothetical cross-section of Homeric *monokrotos* galley; b. Id. of *eikosoros* with hatches, raised gunwale and rowing-benches.



Ill. 4. Plan of ship dedication stereobate in the Heraion of Samos.

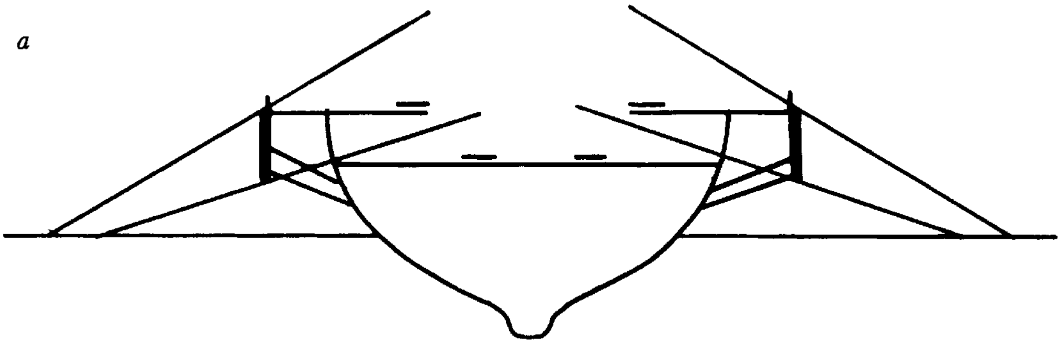


Ill. 5. Hypothetical cross-section of trireme (= *GOS* Pl.25).

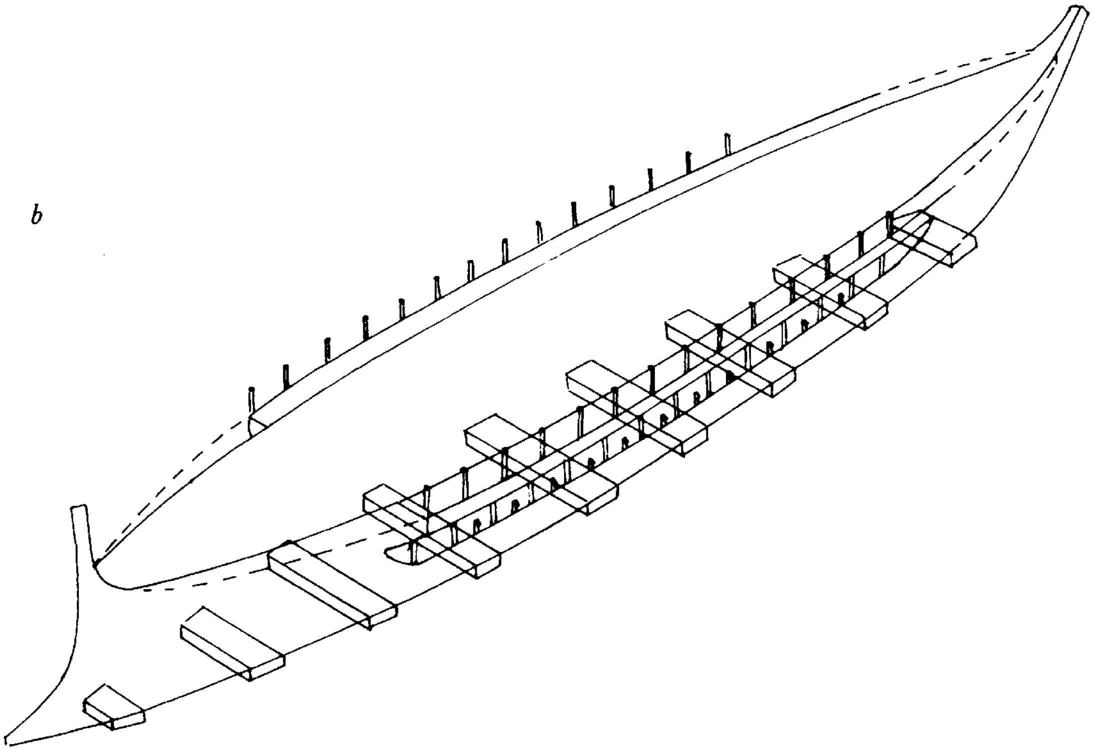


Ill. 6. Hypothetical cross-section of *monokrotos* galley with fighting deck.

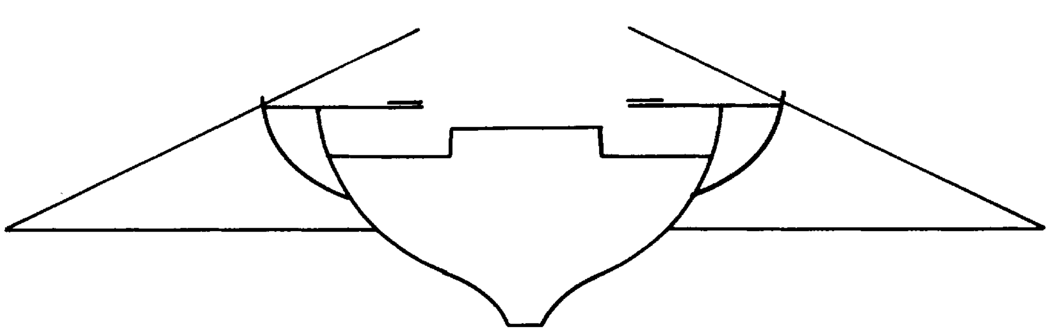
a



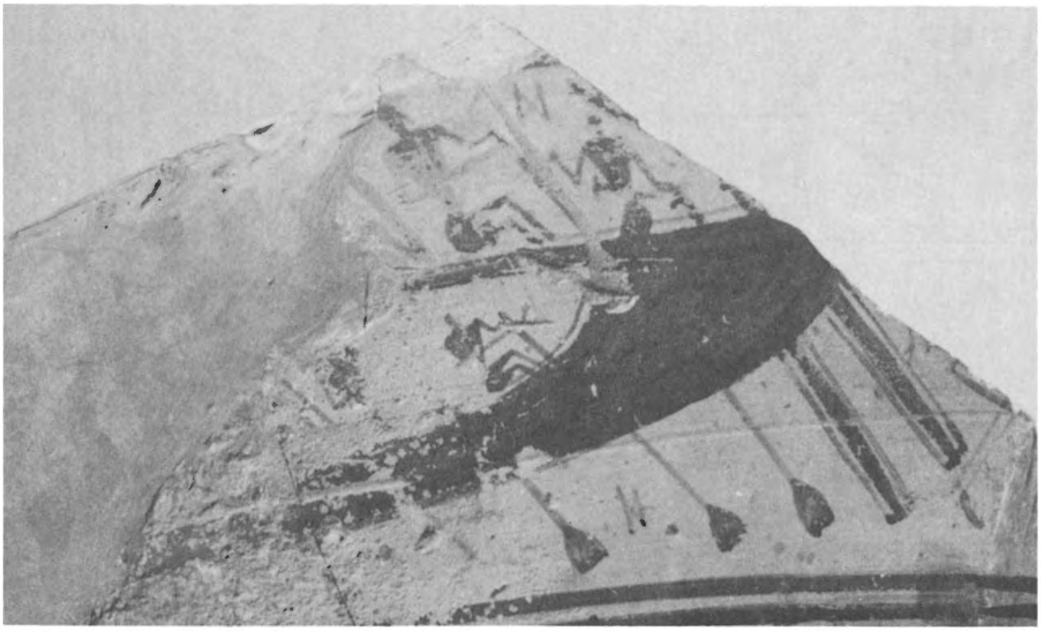
b



Ill. 7a. Hypothetical cross-section of *dikrotos* galley with *parexeiresia* (size of ledger exaggerated); b. Isometric projection of pentekontor based on the contours of the stereobate of Ill. 4.

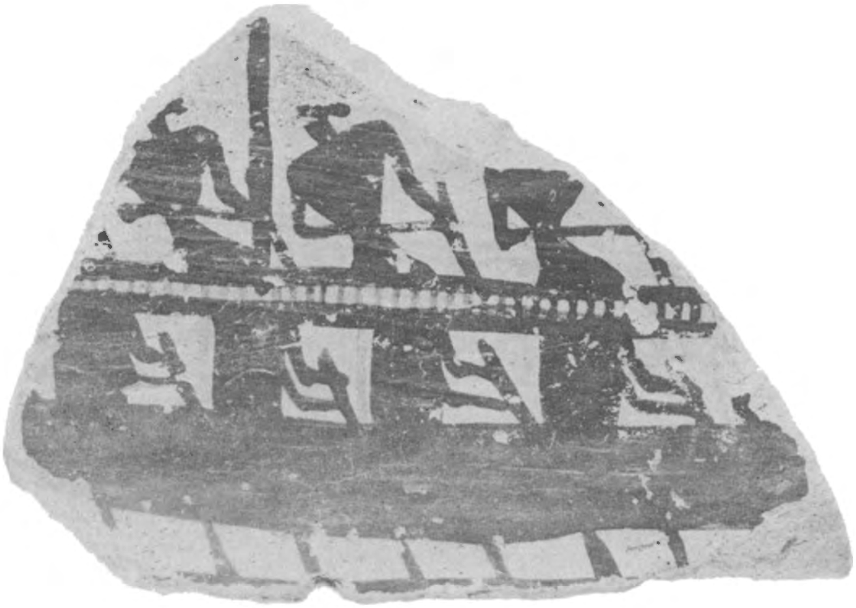


Ill. 8. Hypothetical cross-section of merchant galley (*eikosoros*) with deck, hatches and *parexeiresia*.

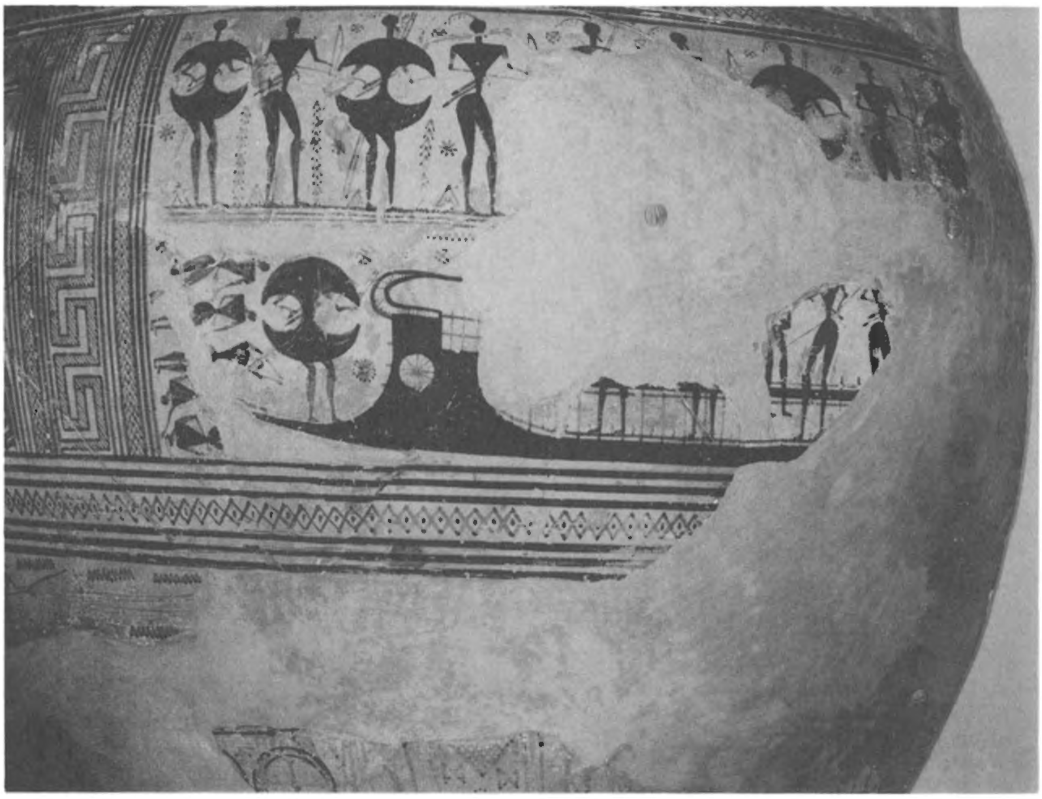


Ill. 9. *Dikrotos* galley without visible tholes; both thranite and zugian oarsmen shown; *c.*760–735 BC (= *GOS* Geom.10). Photo Musée du Louvre (AGR A 530/S450).

Ill. 10. Midships segment of *dikrotos* galley; wicker (?) screens protecting zugian oarsmen; *c.*735–710 BC (= *GOS* Geom.44). Photo National Archaeological Museum Athens (277).

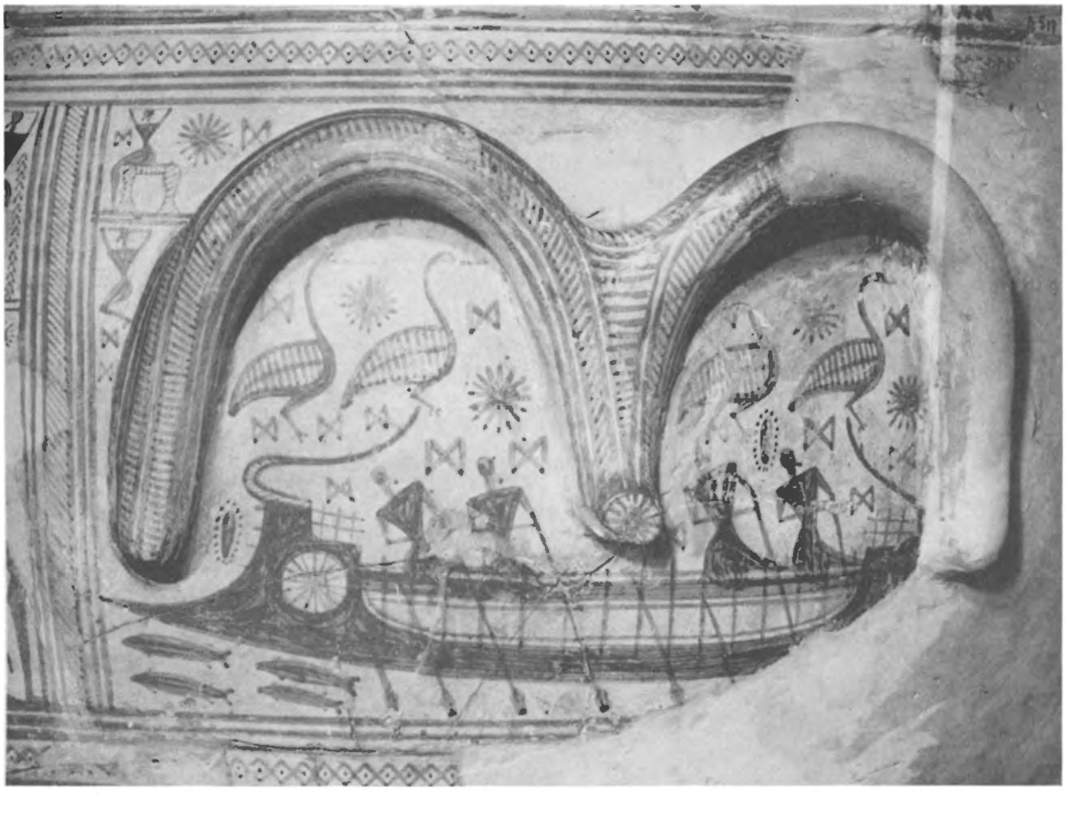


Ill. 11. Id.; screens (in other material?); of same date as Ill. 13 (= *GOS* Geom.43). Photo National Archaeological Museum Athens (276).



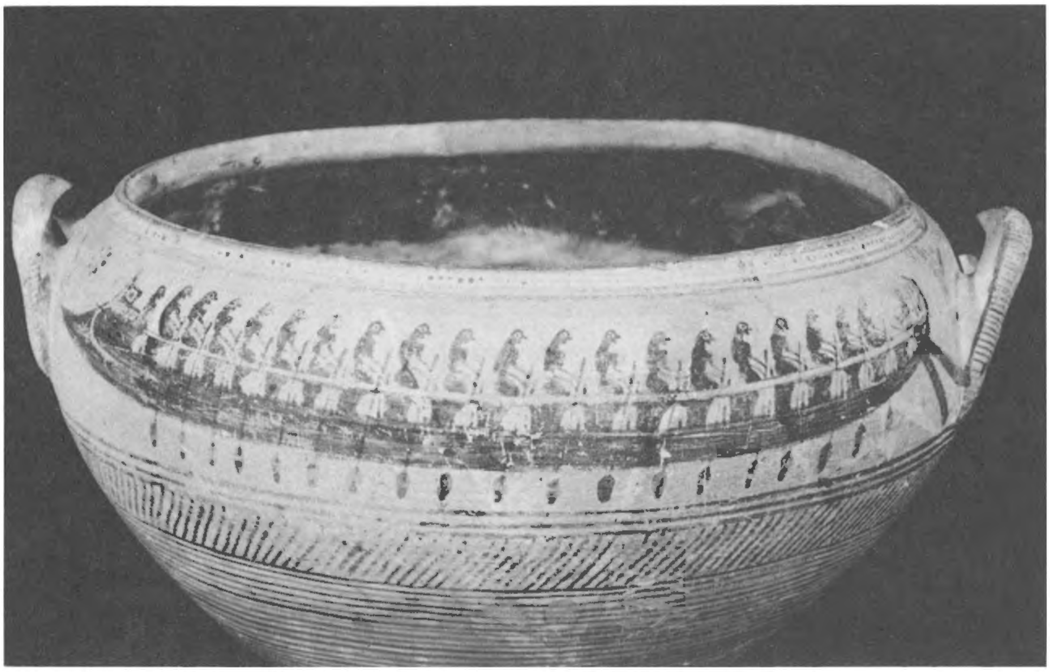
Ill. 12. *Dikrotos* galley, similar to that of Ill. 9, with *parexeiresia*, thranite and zugian tholes shown, but no oars; figures standing on level of *zuga* and of thranite rowing-benches; of same date as Ill. 9 (= *GOS* Geom.2; cf. *GOS* Geom.4). Photo Musée du Louvre (AGR A 527).

Ill. 13. Id.: similar to the galley of Ill. 12, but without the zugian tholes; a rectangular sail; of same date as Ill. 9 (= *GOS* Geom.8). Photo Deutsches Archäologisches Institut Athen (NM 4300).

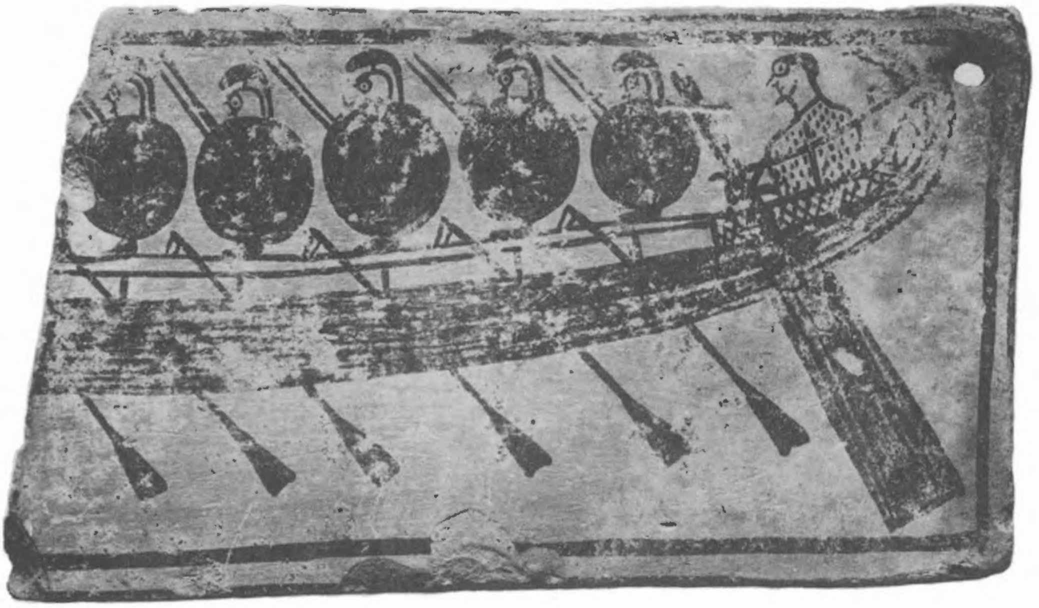


Ill. 14. Id.: similar to the galley of Ill. 9; 14 (15?) thranite tholes, 4 oversize (heroic?) oarsmen, no zugian tholes; of same date as Ill. 9 (= *GOS* Geom.9). Photo Musée du Louvre (AGR A 517).

Ill. 15. Id.: similar to the galley of Ill. 9, without visible tholes; zugian oarsmen shown only; of same date as Ill. 9 (= *GOS* Geom.11). Photo Deutsches Archäologisches Institut Athen (NM 3470).

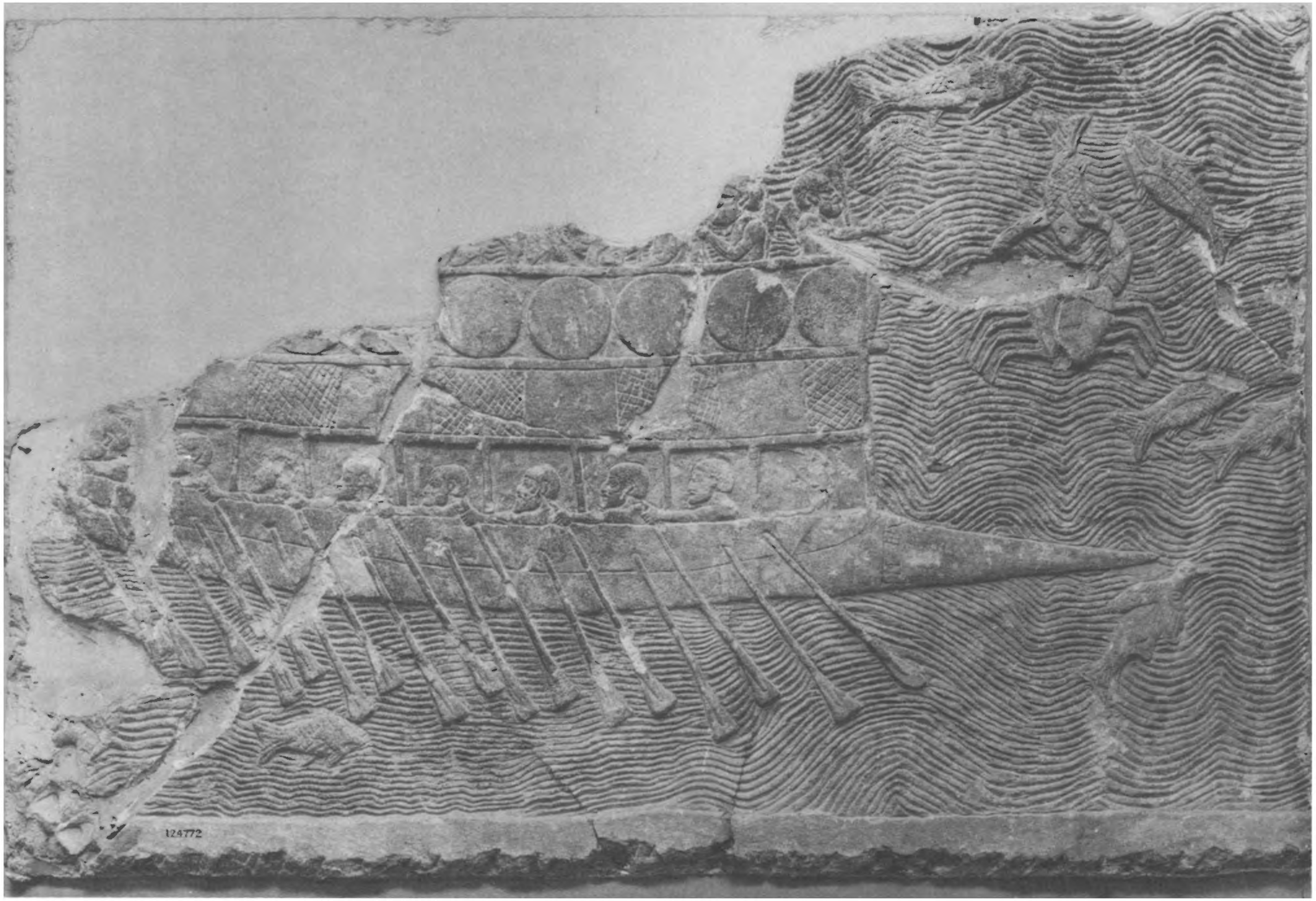


Ill. 16. Galley with *parexeiresia*; 19 thranite oarsmen shown and 21 zugian tholes; of same date as Ill. 10 (= *GOS* Geom.42). Photo Royal Ontario Museum (66GR.265).

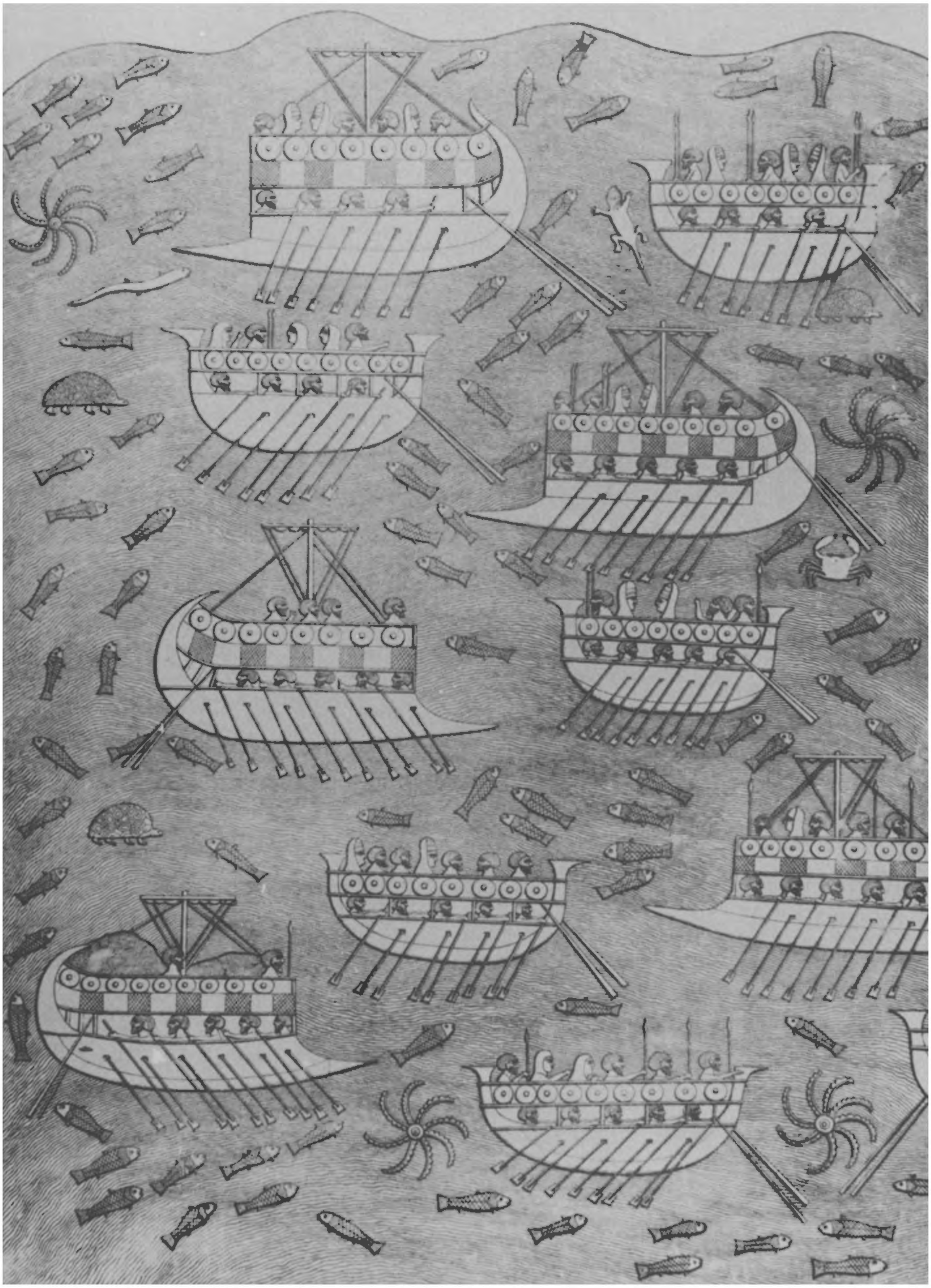


Ill. 17. Id.: no zugian tholes shown: the thranite tholes (?) set between the shores of the *parexeiresia*, not identical with their upper ends; what has been drawn looks more like the oar-strap (τροπωτήρ) than the thole itself; of same date as Ill. 2 (= *GOS* Arch.2). Photo Deutsches Archäologisches Institut Athen (NM 3588).

Ill. 18. Id.: 10 thranite tholes, oars nor oarsmen shown; lower part of *parexeiresia* construction covered by screen; *c*.550–530 BC (= *GOS* Arch.52). Photo Staatliche Antikensammlungen München (KM 3179).

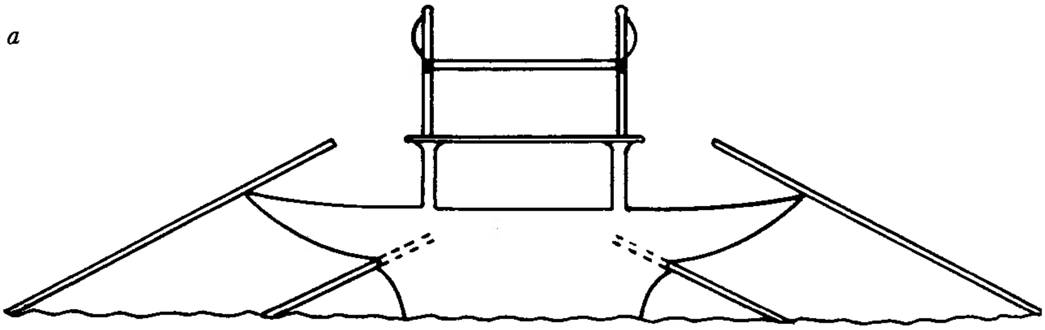


Ill. 19. Phoenician *dikrotos* galley of the time of Sennacherib; 704–681 BC (British Museum 124772 = *GOS* Pl. 22a). Photo The British Museum (E 2015).

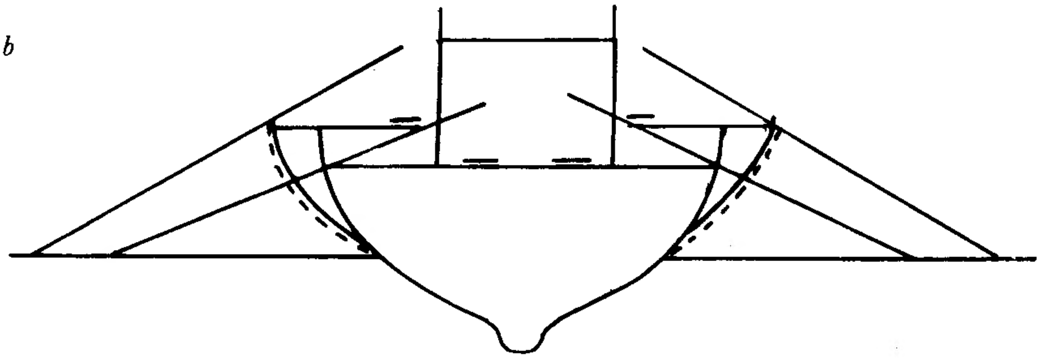


Ill. 20. Drawing of a wall-relief in gypsum from the palace of Sennacherib (= A.H. Layard, *Monuments of Nineveh* I, Pl.71). The ships are Phoenician galleys engaged in evacuating Luli, king of Tyre and Sidon, from Tyre.

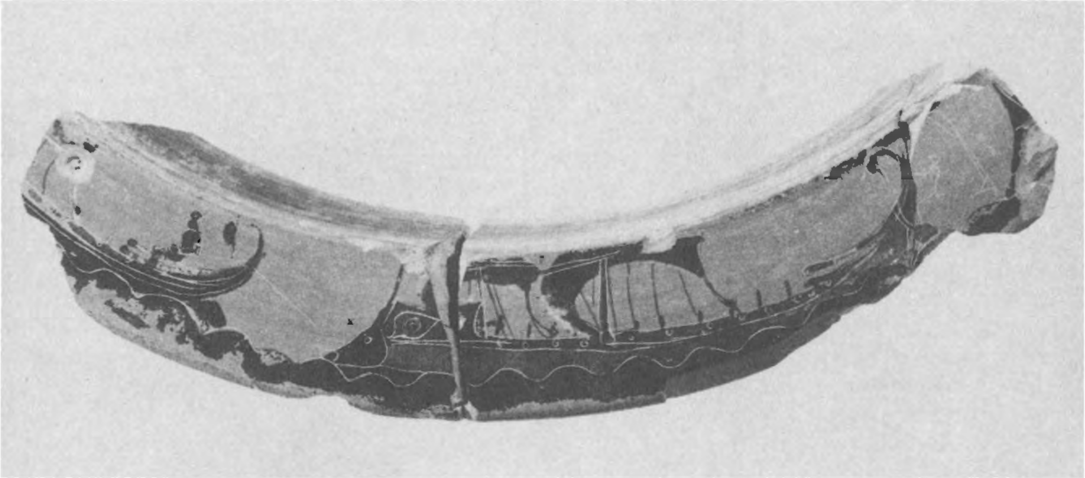
a



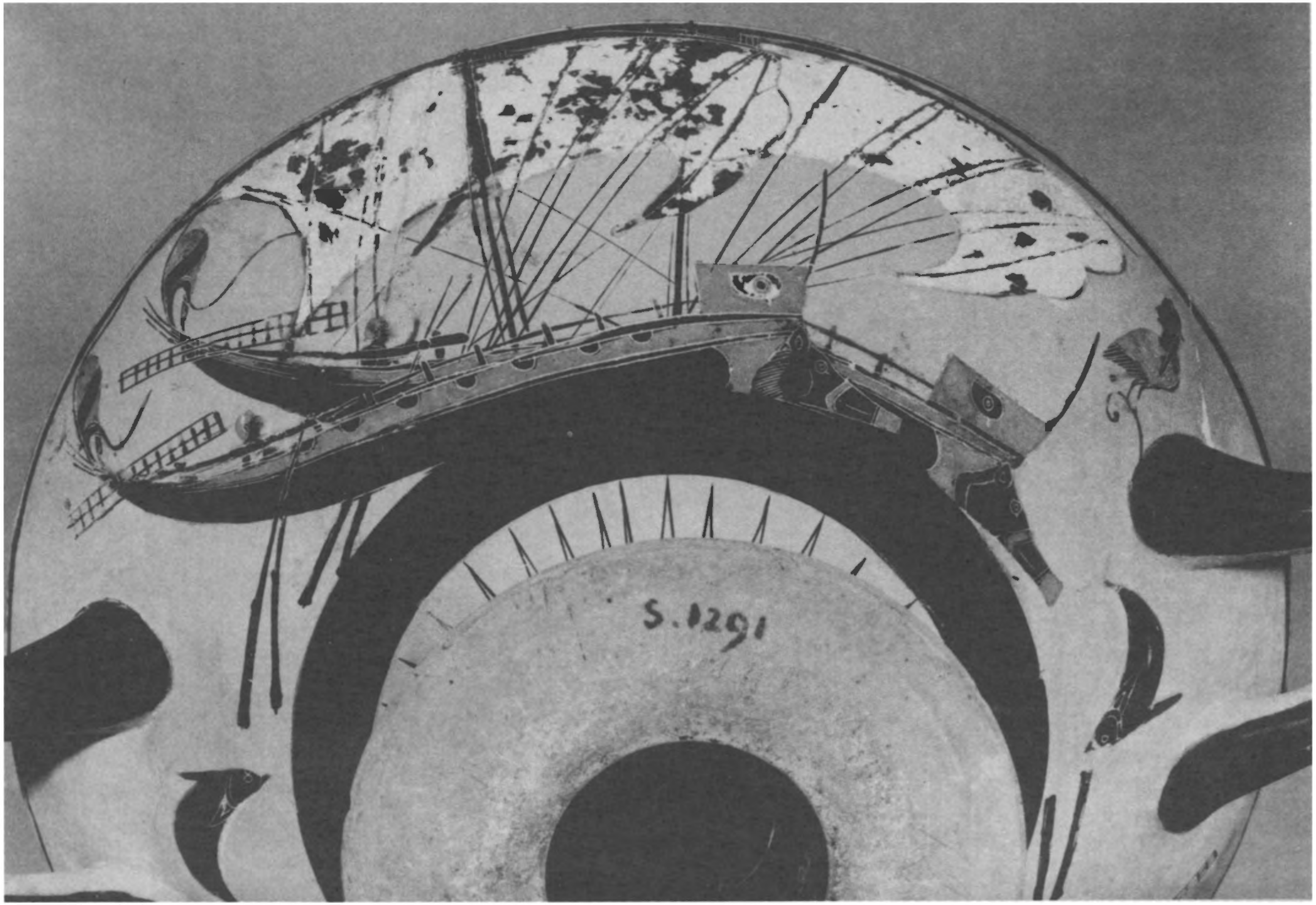
b



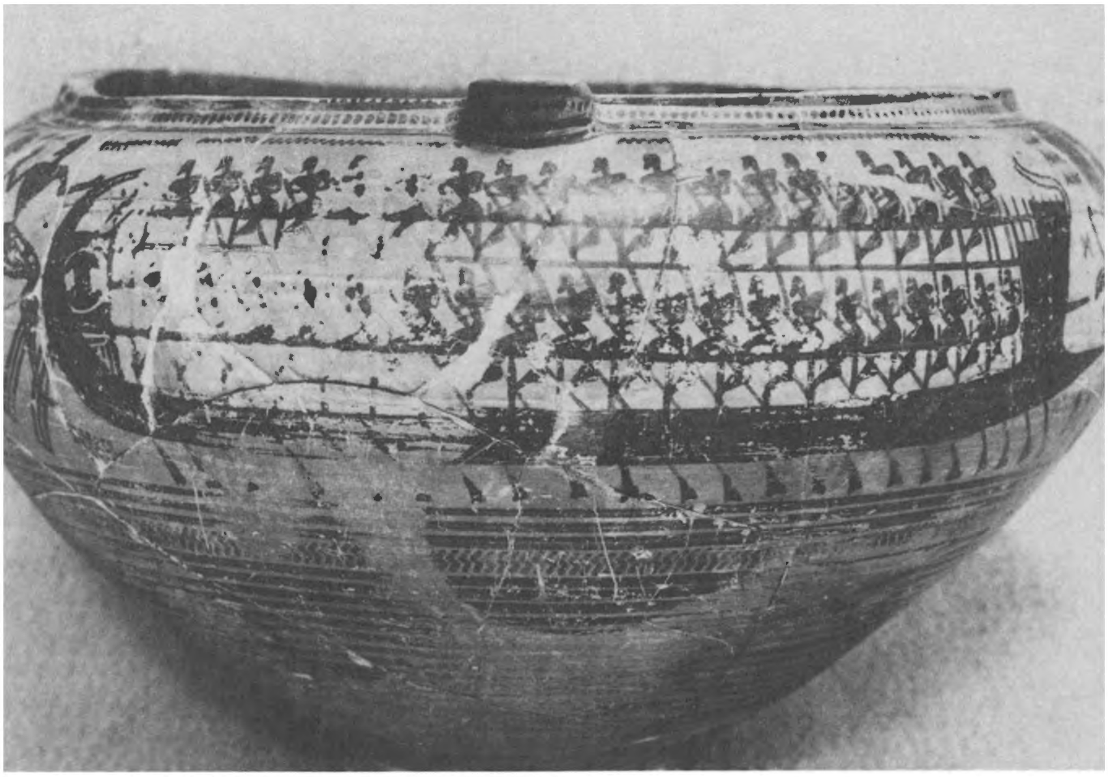
Ill. 21a. Cross-section of galley of Ill. 19 after Salonen (1939: 40); b. Alternative cross-section of the same galley; the dotted lines below the *parexeiresia* represent the screens.



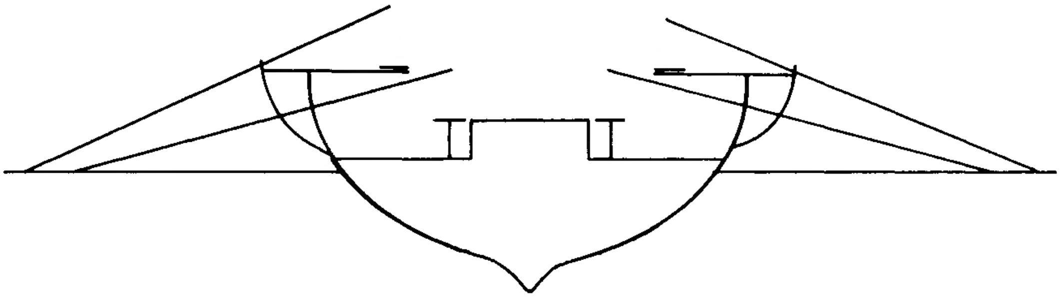
Ill. 22. *Monokrotos* galley: 10 (or up to 12) thranite tholes without oars; in ledger of *parexeiresia* circular openings corresponding with thranite tholes; underneath lighter-coloured screen; middle to late sixth century BC (= Hesperia XLII (1973), fig. 14). Photo American School of Classical Studies Athens (72-62-23).



Ill. 23. *Dikrotos* galley: 7 or 8 thranite tholes; screen with semi-circular cut-outs near the invisible zugian tholes; *c.*530–480 BC (= *GOS* Arch.57). Photo Musée du Louvre (AGR F 123).



Ill. 24. Galley with 39, perhaps meant as 40, oars; of same date as Ill. 10 (= *GOS* Geom.19). Photo The British Museum (C 1097).



Ill. 25. Hypothetical cross-section of Polykrates' *samaina*, combining deck and hatches of the *eikosoros* with the oarage of the pentekontor (*c.* 535–525 BC).